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# *The Green Thumb*

A Publication of Denver Botanic Gardens

JANUARY-FEBRUARY

1965



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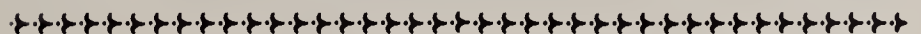
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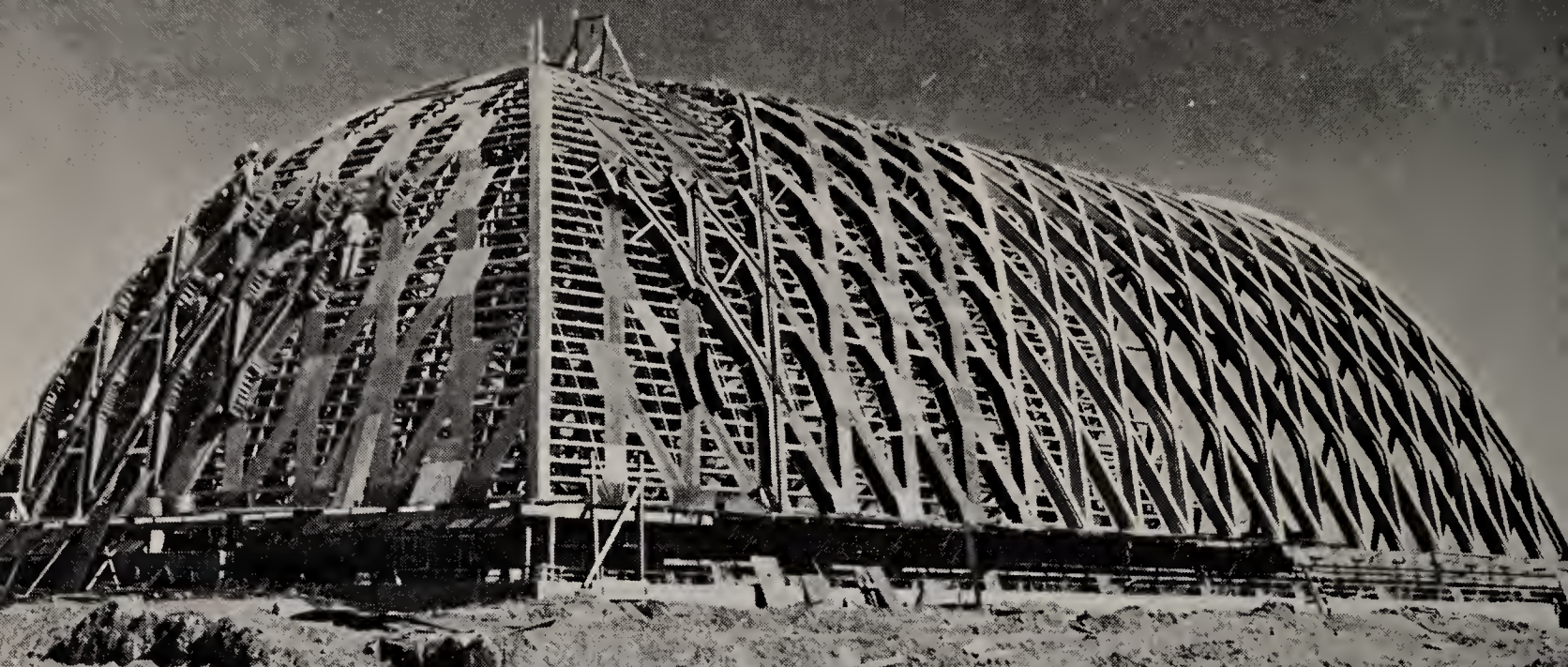
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## THE COVER

At timber line, Mt. Goliath, Colorado. Drawing by  
the late William H. Crisp.





## DIRECTOR'S REPORT FOR THE YEAR 1964

A. C. HILDRETH

### CONSTRUCTION

THE YEAR 1964 MARKED the beginning of actual construction on the building program planned for Denver Botanic Gardens. The work started on the dominant structure, the conservatory, donated by the Boettcher Foundation. On January 13, Contractor Gerald H. Phipps, Inc., began moving equipment onto the conservatory site and on January 21 grading for the building got under way.

For months the work was mostly underground, installing the massive concrete and steel foundation members necessary for the weighty structure. Eventually the building emerged above ground and began to take shape. It now completely dominates the landscape in that part of the city. The concrete strands of the superstructure weave a fascinating lacy pattern in the blue Colorado sky and against the backdrop of the Rocky Mountains.

An auxiliary greenhouse range with adjoining laboratory rooms and space for cool storage of bulbs and other plant material was made possible by a gift from an anonymous donor. This gift was supplemented by a small allotment from the City and County of Denver. Bids for erection of this build-

ing were opened on November 17 and the lowest bidder was Gerald H. Phipps, Inc. On December 22, the contractor started work on the greenhouse site which is located immediately west of the conservatory.

### CHILDREN'S GARDEN

The past year was the fifth for our children's gardens. The 1964 program was considerably expanded as compared with those of previous years. In our children's garden enclosure 136 boys and girls grew flowers and vegetables on their individual plots. Each child completing the program received a certificate at the graduation exercises on September 19 at Botanic Gardens House. On the same day a fair was held in the garden area where the youngsters displayed their products. Ribbons were awarded for outstanding exhibits.

Prizes were awarded for superior gardens. Winners in the beginning group were: 1st prize, Colleen Urling; 2nd prize, Ann Jaramillo; 3rd prize, Cathy McDonald. Mary Egri, John Grant, Kathy Joy, Rosemary Martin, Dennis McCoy, Anne Moore, Mark Pretz and Dave Pugh received honorable mention.



Children's Garden Shelter House.

Winners in the advanced group were: 1st prize, Tia Kawakami; 2nd prize, Toby Layden; 3rd prize, Phil Martin. Janet Bartley, Jack Conrad, Joe Craighead, Sheila Kenney, Nick Layden and Billy Schaetzel received honorable mention.

The Kiwanis Club of Denver further honored the two first-prize winners by entertaining them at a luncheon meeting at which each was presented with a \$5.00 check.

Mrs. Alonzo Lilly, Mrs. Claude Burt and Mrs. Russell Qualls, generously donated their expert services in judging the gardens three different times during the season and also in judging the fair exhibits.

Volunteer supervisors are essential to our children's garden program. Mrs. James C. Layden again served as chairman of the Supervisors' Committee and the success of this year's gardens is due largely to her efficient management and untiring efforts.

Thirty-four other volunteers took turns supervising the children during the gardening hours. These were Dorothy Andrews, Elinor Becker, Robert Costello, Helen Coyte, Shirley Craighead, Luba Egri, Virginia Faxon,

Yolande Fillis, Hans Forselius, Bill Grant, Millie Grant, Dr. Joseph W. Hovorka, Frank Jaramillo, Emily Joy, Bert Kauffmann, Mary Kauffmann, Mary Knapp, John Maloney, Howard Martin, Stella Martin, Geraldine McCoy, Anita McDonald, Martha Metzger, Louis Mosley, Gloria O'Dowd, Jim O'Dowd, Catherine Olson, Catherine Reynolds, Mary Robbins, Peg Schaetzel, Mary Lu Shepherd, Gen Turner, Jean Thompson and Edna Vessa.

A separate area west of York Street was provided for children interested in gardening as a scouting activity. Ten Cub Scouts, Pack 132, under the leadership of Mrs. T. J. Longley and eight Girl Scouts, Troop 431, led by Mrs. J. J. Habas, grew gardens in this area and received graduation certificates.

For the first time we extended our children's garden activities beyond the confines of Denver Botanic Gardens, by sponsoring a program at the Retarded Children's Center, 8000 Montview Avenue. Our participation involved supplying tools, seeds and technical advice and presenting graduation certificates. With the cooperation of Mrs. William Bell and Mrs. Charles C. Hardin of the Center, 20 pupils grew gardens with gratifying results.

Donations during the year from commercial firms have been of great benefit to our garden program. Barteldes provided vegetable seeds for planting and also tools to be used as prizes for the winning gardeners. Green Bowers Nursery and Garden Center gave a tulip bulb to each gardener as a special graduation present. Hannigan's Greenhouse and the Rocky Mountain Seed Company both donated plants. Mr. E. E. Eiche, local representative of Rapid-gro Corporation presented a supply of fertilizer. The Empire Savings Building and Loan Association

and Montgomery Ward & Company both gave small hand tools which were much needed by the young gardeners. Mr. Bill Howell of the 7-Up Bottling Company again sponsored the 7-Up Club. Dues were 7 weeds pulled up each day that the member worked on his plot. The Company furnished gratis 7-Up for a club party each month and also for the graduation day exercises.

The garden season ended with Cleanup day, October 17, when the children cleared their plots in readiness for next year's planting. On this occasion each gardener received a pumpkin for a jack-o-lantern. These pumpkins were donated by Kuner-Empson Company, Longmont, Colorado, through the kindness of their treasurer, Mr. E. R. Moore.

### PLANTINGS

Plantings of annual and perennial flowers were more extensive than in

previous years. There was the usual display along Josephine and York Streets; however, Mrs. Frances Novitt kindly revised the 1964 planting list in some beds to provide better adapted species, thereby improving the general appearance.

Inside the fence, the area of experimental plantings was greatly enlarged. Included were 95 varieties of petunia, 51 of marigold, 22 of celosia, nine of ageratum, eight of snapdragon and six of amaranth. Particularly outstanding among the bedding plant trials were the mass plantings of geraniums containing a total of 5,280 plants of 12 different varieties.

Captain W. R. Wright again planted a fine collection of dahlia varieties. Some were newly imported from Holland where so much good dahlia breeding is in progress.

The "Guest Iris" planting grown for the 1963 American Iris Society convention, again made a good display of



Day lilies blooming in the York Street Unit.



Petunia trials at the York Street Unit.

flowers. After bloom, the entire planting was dug up and inferior selections were discarded. The remaining ones were divided and replanted. As a result, this planting is only about half its original size.

Gates Rubber Company employees increased the planting of native species in the Gates Memorial Garden and otherwise improved this development. The Colorado Gladiolus Society provided a fine display of gladioli, including many interesting hybrids produced by two local breeders, Mr. Lee Ashley and Mrs. William Wood.

More than 15,000 square feet of bluegrass sod was laid as walkways and borders in the various planting areas. The sod was grown in a sod nursery in our York Street Unit.

The Japanese barberry hedge was planted around the plant production part of the area to be developed as an herb garden by the Denver Botanic Gardens Guild.

Our plantings were greatly benefited

by services donated by two commercial companies. Swingle Tree Surgeons, Inc., again sprayed all our trees and shrubs around Botanic Gardens House and T. R. Collier Landscape Service sprayed our main lawn area for weed control.

Last fall another planting of tulips was made. The 7,600 bulbs representing 152 varieties were furnished by the Netherlands Flower-Bulb Institute, Inc. This year's planting is a continuation of a test started by the Institute in 1962 to obtain comparative data on the performance of tulip varieties in different parts of the world.

Some progress has been made in assembling plants for planting in the conservatory. Thus far all have been gifts. The first was a load of plants from Missouri Botanical Garden, which were picked up by truck. Several plants have been sent to us from the Longwood Gardens, Kennett Square, Pa. A large number of tropical species have been received from the homes and hobby greenhouses of people in Denver and the surrounding communities. These plants are being held in the City Park Greenhouse until the conservatory is completed.



Gates Memorial Garden.

## ASSOCIATES

A very significant development of the year was the organization of Denver Botanic Gardens Associates. This movement started the first part of 1964, when devoted people under the leadership of Mrs. Mary Smith and Mrs. Frances Morrison undertook to help the Botanic Gardens in whatever needed to be done.

Their first activities included planting and maintaining the grounds around Botanic Gardens House, weeding experimental plantings of annuals and cutting withered flowers in the rose garden in our City Park Unit and also in all the plantings in our York Street Unit.

Later they supplied hostesses who greeted visitors and guided them through Botanic Gardens House. Some took a training course in the plants and garden developments, in preparation for guiding tours through the gardens. These guides were able to show groups of school children, totaling about 600 through the plantings during the few weeks between the opening of the schools and frost.

Other activities included helping the Library Committee in various types of library work, assisting the Education Committee in ticket sales for three special lectures and conducting a successful sale of African violets which were generously donated for this purpose by Mrs. Jan Schoo.

In September this informal group organized as the Denver Botanic Gardens Associates, adopted by-laws, elected officers and appointed committees. At present they have 86 registered members. This is one organization that has no limit to its membership and no dues.

In mid-November steps were taken toward opening a gift shop where books, flower-arrangement materials and handmade gifts all pertaining to

botany, gardening or decorating with plants are offered to the public.

On December 8 the Associates held a silver tea at Botanic Gardens House as a social and fund-raising activity. The occasion also served as the formal opening of the gift shop which was well patronized by Christmas shoppers. The house, both inside and out was decorated by the Associates in the Christmas tradition.

## HELEN FOWLER LIBRARY

The Library Committee under the capable leadership of its Chairman, Miss Lucy Crissey, accomplished much during the past year. The library was rearranged for greater efficiency. New shelving was built in the basement to make the overflow of books and periodicals more accessible. Purchase of a book cart made the handling of books more convenient.

During 1964 more than 650 additions were made to the library material through purchases and especially through gifts from private libraries. Chief donor was Dr. E. R. Kalmbach, who turned over to our library 350 books and pamphlets from the library of the late Kathryn Kalmbach. Dr. Edmund Fulling, Curator Emeritus of New York Botanical Garden, presented 217 books and Dr. A. C. Hildreth gave 68 volumes.

The long-delayed inventory of books in the main library was made this year. Mrs. Mary Hellriegel, in addition to the usual routine library duties she has performed so faithfully for so many years, took on the tasks of cataloging all the new accessions and of training interested associates in library work. Special recognition is due Associates Mrs. Bern Neil, Mrs. Chester Wasson and Mrs. Earl Wilson for valuable services rendered in various library activities.

# Some Notes On LANDSCAPE DESIGN

JOHN DILLAVOU

*Associate, American Society  
of Landscape Architects*

FEBRUARY IS the time to begin thinking about spring landscaping projects. As a matter of fact, bare-root plant material can often be set out beginning in mid-February, thus starting the spring planting season. There is still time, however, to devote some careful thought to what landscape planning might accomplish.

For example, consider plant material strictly from a dollars-and-cents standpoint. A house set off by nice plantings will be 15% to 20% more valuable than one with no planting at all. Ragged or overgrown plantings will lower the resale value of a house. The resale value can be increased as much as 40% if the plantings are kept neat and healthy. Remember, small plants, if they receive proper care, will develop into handsome large plants which are many times more valuable than their original purchase price.

A figure of 10% to 20% of the cost of the house and property is generally given as the cost of landscaping. It depends, of course, on what the owner can afford and needs and what is already on the property. The cost of

landscaping can include grading, soil preparation, planting and construction of walks, drives, fencing, patio, sprinkling system, the landscape architect's fee for a development plan and charges for his supervision of landscape construction. Swimming pools and tennis courts would entail extra planning and additional charges.

Sound landscaping pays off, not only in increased real estate values but also in the additional pleasure derived from outdoor living, as well as in having a home and grounds which are an asset to the neighborhood. Planning will actually reduce the cost of the landscaping development. The family on a modest income, in these do-it-yourself days, can enjoy what was once considered a privilege of those in a higher income bracket.

Plans on paper are essential to any landscaping project. They serve as a guide for action, whether dealing with a brand new house or an older one with an established garden and whether the owner plans to do all the work himself or pay others to do it. Of course the services of a landscape architect



Front yard designed for good looks and minimum maintenance.

will be most helpful. The city building inspector, in most cases, will be glad to help with suggestions to make sure new projects comply with the various building codes.

A survey of existing conditions should be made. Then, some very careful thought should go into deciding exactly what the owner wants from his property — all the things he needs and all the things he would like to have even if he doesn't need them. Following this, the dominating theme, as established by the landscape architect, will influence what type of yard and garden can best be used and enjoyed. On the other hand, haphazard planting and construction of landscape details is more expensive because it is almost impossible to avoid mistakes. Increased costs, due to poor planning, will cut down on the value of the property. It is much cheaper, in the long run, to have a good landscape plan to follow and to develop the property in the correct way.

Many people think that elaborate landscape development would create entirely too much maintenance. Actually, proper landscaping may cut maintenance in half. Some properties have no grass to mow but instead, have many surfaced areas, planting areas and ground cover lawns that need no mowing. In these cases, maintenance

may be mostly a matter of watering properly.

If the house is being custom built, the landscape should be taken into consideration and planned in conjunction with the house construction. Setting the house properly on the site is very important if the maximum benefit of climate for both inside and outside living is to be attained. Such planning also enables the owner to take advantage of the entire features of the property, such as views of the mountains and will also allow for the most efficient screening of an objectionable feature, such as a nearby highway.

Drainage and grading are important and can enhance a new house by introducing pleasant contours to the land and creating areas for such features as rock gardens, walls, pools and steps. By using grade differences, service areas, unpleasant views and traffic can be concealed.

We should not build a house first, install the drives, fences and walks and then try to cover up the mistakes by planting. Instead, these necessities should be planned so that they are

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parts of a complete unit, integrated properly with areas allocated to other types of use.

A good landscape plan should provide the maximum comfort, utility and beauty by means of the following features: summer shade; winter sun and warmth; protection from cold winter winds; maximum use of cooling summer breezes; easy and direct access to house, garage, service yard and other areas; boundary demarcation; privacy and seclusion; reduced maintenance; an opportunity for serious gardening; safe play space for the children; an outdoor living space for all the family;

attractive and friendly appearance from the street; beautiful views from the windows; screening out of ugly views. It's amazing the number of things that good landscaping accomplishes.

Let's discuss a few of these features in more detail, starting with the front yard. The front of a house reflects the owner's personality. It can be enhanced so that it is distinctive and says "Welcome" in a personal way. Foundation planting helps to blend the house into its surroundings. Plant material can complement the forms and colors of the house and can improve its proportions. For example, a long roof line can be broken up or the bulk of a second-story addition on one side of a house can be balanced by adding a group of tall shrubs or a tree. A screen of shrubs can soften the view to neighboring houses. In brief, planting can be used to create a frame for a "picture." The "picture" is the front of the house and the focal point is the front entrance.

The front yard must have other features besides proper planting. The walk



Garden bench of redwood.

is the most important part of the entry and should be wide enough to allow at least two people to walk side by side. An impressive walk sets the house apart. Indirect lighting on the entry is effective. White concrete, light colored walls and walks are the best reflectors of light. Light is also a very important safety factor, discouraging vandalism and lighting steps and walks for the safety of guests. Be sure the light itself is below eye level for light glaring in the eyes is not only uncomfortable but hazardous.

Permanent plantings in tubs may be moved around for a variety of effects at different times of the year. A decorative screen or fence at the front of



A narrow side yard would lend itself to this type of treatment.

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the lot enhances the entry and prevents a direct view into the house. Before installing fences or screens, check local building and zoning codes.

The front of the yard is the public area and reflects the owner's attitude to the passerby and to friends and neighbors. Side yards generally become access areas or if they are wide enough, service areas or small gardens. Here, sound planning can insure maximum use and a surprising amount of charm which is important if the area is fre-



A large patio for outdoor living.

quently used. Side yards can be designed so that they are screened off, benefiting the immediate neighbors as much as the owner and can even become small bedroom-patios or kitchen-view gardens.

The rear yard is often the private garden but many maintenance and service features can be designed into it, depending on the shape of house and lot. These areas can be screened and yet can be kept easily accessible. The rear yard is generally the best location for the outdoor living area or patio. It should be planned for recreation, dining and entertaining. Retaining walls, intelligent grading and fencing all insure the privacy required to enjoy it.

Maximum privacy is obtained by erecting fences such as the horizontal louver and close-set grapestake types. Medium privacy is offered by the vertical louver, board-on-board and spaced slat types. Chain-link, lattice, picket and post-and-rail fences offer the least protection. Proper planting (not necessarily against the fence) not only increases the privacy provided by fencing but adds to the beauty and comfort of the outdoor living area. Plantings may help ease winter winds or cut hot summer sun rays. A necessary change in grade on a sloping lot can be made to work with the other items to produce a screening effect. To add height, fences or hedges can be placed on top of retaining walls. If

space permits, a berm or small mound of earth might be created, adding a sense of separation both horizontally and vertically as well as introducing the charm of a small area of sloping land to the garden.

Back yard landscaping should include plans for a children's play area where they can be safe and easily watched. A sandbox is essential and can be designed so that after it is no longer needed, it may be converted into a planter or flower area. Space to ride wheeled toys should also be provided. Upkeep can be reduced by the hard surfacing of this area. A low-branched tree may become "Tarzan's jungle."

Be sure outdoor furniture will withstand the weather. If made of wood it should be rot-resistant. Redwood is the most durable. A comfortable size for benches is 18 inches high and 12 to 15 inches wide. Tables for eating are best at 28 to 30 inches in height. In-

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stead of a permanent masonry fireplace, consider a portable grill.

It is probably in the design of the rear yard that the landscape plan can become most personalized. If a great deal of gardening is planned, that must be taken into account. Are outdoor games and entertainment important to the family? Do they just want to sit in the shade and read? Each use calls for a different approach. Desirable extras can be outlined early, added gradually. Swimming pools are getting cheaper

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and the cost can be reduced if they are do-it-yourself projects. Garden pools are smaller luxuries which can be adapted to many gardens. Submersible pumps make garden pools more economical as they use the same water over and over. Pools may be stocked with aquatic plants and fish may also be added. Lighting (indirect is best) enhances outdoor living at little cost.

Let's discuss reduced maintenance in more detail. Many times when planning a residence I hear "I don't want anything that requires hard work to maintain." In fact, this is what most of the homeowners of today want. Of course, there is no such thing as a work-free garden. As long as there are plants, lawns and weeds, there will be work. Let's take a look at a small garden and see where some of the time is spent:

1. Hedges clipped often to keep them neat.
2. Annual border changed two or three times a year and weeded regularly. Plants spill over into yard.
3. Walk divides lawn into two narrow strips, multiplying edging and clipping work. Location of walk encourages traffic across corners of lawn.
4. Gravel from path gets into lawn and mower.
5. Tree leaves falling on ground create disposal problem. Large leaves must be raked and raking seems a constant need.
6. Perennial border and ground cover area must be edged by spade.

The same space can be redesigned for low maintenance in the following fashion:

1. A raised bed, planted informally, frees shrubs and herbaceous plants and allows them to grow

better. It requires little attention.

2. A mowing strip of brick, wood or concrete reduces hand trimming.
3. New arrangement of lawn area reduces edging job. Larger expanse of lawn is better than small chopped up sections.
4. The leaves of tight-growing ground covers like *Ajuga reptans* (bugleweed) are easy to wash off the walk with the hose. The leaves of spreading junipers sift down out of sight and are not a problem.
5. Trees with small thin leaves such as 'Moraine' and 'Shademaster' honey locusts are choice here. The leaves practically disappear without raking.
6. Maintenance is reduced by changes in design more than by changes in plant material.

The plans for a low maintenance garden should emphasize the use of the mowing strip and raised bed as well as enlarged paved areas. Once you have a mower going it is almost as easy to mow 3,500 square feet of lawn as 2,500 square feet. It does make a dif-

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ference if the expanse of lawn is in small sections or large ones. The use of gravel, ground covers and paving materials reduces maintenance even more.

Low maintenance, again, begins with a plan. Without a plan you find yourself being subjected to hours of back-breaking work. Even if the garden is an older one it can be rejuvenated with careful replanning. It can be saved and at a lower cost than you might think. The end result will be more leisure hours to enjoy the garden.

# A MOUNTAIN PARKWAY

S. R. DEBOER



(Reprinted with permission, from *Parks & Recreation*, April, 1964)

“In time of Peace prepare for War” is the slogan for military preparedness. Perhaps we should add another one, “In time of Peak Prosperity prepare for Unemployment.” It is with this thought in mind that I suggest a parkway in the high mountains along the Continental Divide, the backbone of America. Such a park road, above timberline in places and in the forest in other places, will certainly be a bold project and become the most spectacular road of this kind in the world. It may be bold but doesn't the rest of the world look to us Americans to build daring enterprises?

Such a parkway might stretch from Glacier National Park to Yellowstone Park by the Grand Tetons, to Rocky Mountain National Park, to Hyde Park near Santa Fe and to Sandia Park

near Albuquerque. It could extend southward to El Paso and Big Bend National Park and beyond this into Mexico. Its northern extension might reach deep into Canada and Banff National Park.

The Rocky Mountain region is thought of by many as the recreation land of America. Of course, many major areas such as the Pacific Coast region, the Atlantic Coast region, the Minnesota lakes and the Florida peninsula, are also in competition for this title. None of these, however, has the 2,000 miles of unbroken mountain lands of the Rocky Mountain region.

This mountainous land is not limited to the United States alone. As mentioned before, it extends deep into Canada and Mexico. In this Rocky Mountain region are many of the major national parks of the nation. The num-



ber of visitors to these parks runs into millions.

Many more persons visit the national forests of the region, the municipal mountain parks of Denver, Boulder, Fort Collins, Colorado Springs and Pueblo in Colorado and the parks of Albuquerque and Santa Fe in New Mexico.

In passing through five states, the route of the parkway would climb to dizzying heights and pass by the eternal snows. It would drop down the wooded slopes below the timberline. It would pass by the natural alpine flower gardens with their unique flora and where the yellow dogtooth violets peek through the melting snow in the higher altitudes. Meadows and tundras form a veritable paradise for the plant lover. The route would pass the gnarled trees of the timberline with the bark scorched off their windward sides; the alpine ferns creeping over the ground and the dead trees standing as mute evidence of the conflict between plant life and the elements in nature's own battlefield. Beautiful mountain lakes in which the high peaks mirror themselves and which contain fighting mountain trout would lie along the route. In some places, the route would be above ski slopes; in others, it would be below. In many areas, it could be used as a winter access road for these ski areas. In some places the road would be on the Continental Divide and in other places the Divide would be silhouetted against the sky above the road.

Construction of the road must be based on the principle of comfort and safety, especially at the higher altitudes. There must be many lookout parking places. Construction must not be based on speed and commerce.

At strategic points along the road service stations, restaurants and rest-rooms should be provided. Everywhere

there should be small parks with picnic tables and the major scenic areas should be acquired through large acreage purchases. It would be primarily a summer road although some parts might be open to winter traffic. Major ski areas should be interconnected by the road. Wildlife habitats must be preserved and protected. Along the entire length of the road there should be designated areas for the study of flora and fauna with guided tours available to visitors.

The log of the road, briefly, subject to detailed surveys, would be as follows:

From Denver, north:

1. Beginning at Echo Lake in the Denver Mountain Parks on the slopes of Mt. Evans (14,260 feet), over Loveland Pass (11,992 feet) and Berthoud Pass (11,314 feet), around Torrey's peak and the Arapahoes (12,873 feet) along the east slope of Long's peak (14,255 feet) and the Mummy Range (13,413 feet). Here the road would cross the high altitude road of the Rocky Mountain National Park—the world renowned Trail Ridge Road. At various points there should be connections with Denver, Boulder, Loveland and Fort Collins, Colorado. Many of these connecting routes are in existence today.

2. Over Cameron Pass (10,285 feet) west of Fort Collins the road would run along the Medicine Bow mountains into Wyoming (12,900 feet) with a connection to Cheyenne and Laramie and thence to the mountains east of the North Platte River and its lakes, to the Wind River Mountains with connections to Casper and Lander, Wyoming.

3. Around the Grand Tetons (13,700 feet) north to Yellowstone National Park and around Yellowstone Lake, perhaps on existing roads,

through the park to the Madison River and the northwest entrance of the Park.

4. Along the mountains east of the Gallatin River and by way of Bozeman, Montana, to the slopes of the Bridger Mountains; thence along the lakes of the Missouri River with a connection to Helena, following the Continental Divide.

5. Into the South Gate of Glacier National Park, through the park to the Canadian border and from there into Canada, connecting with the Canadian National Parks at Banff with a road to Calgary and Edmonton.

From Denver, south:

6. From Echo Lake in the Denver Mountain Parks along the upper slopes of Mt. Evans to the Fairplay Mountains and Mt. Elbert (14,431 feet), Colorado's highest peak with connections to Colorado Springs and Pike's Peak (14,110 feet); thence the road would follow the Collegiate Range—Mt. Princeton (14,177 feet), Mt. Harvard (14,309 feet), Mt. Yale (14,172 feet)—and by Monarch Pass and over Poncha Pass to the Sangre de Cristo Range east of the San Luis Valley.

7. Along the Sangre de Cristo Range with connection to Pueblo and by the great Sand Dunes National Monument and over La Veta Pass to the border of New Mexico.

8. Continuing along the Sangre de Cristo Range by Taos Indian Pueblo to Hyde Park near Santa Fe and thence south to the Sandia Mountains and Sandia Park and Albuquerque.

9. South of Albuquerque along Elephant Butte Lake and old Indian ruins to the Organ and Andrews Mountains and into El Paso.

10. South of El Paso and Juarez, Mexico, to the Great Bend Monument and along the Rio Grande into Mexico by way of Monterrey and Mexico City.

# Announcing Summer Seminars In Rocky Mountain National Park

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PLANT TAXONOMY,  
ALPINE TUNDRA ECOLOGY,  
MOUNTAIN ECOLOGY

**R**OCKY MOUNTAIN NATIONAL PARK presents an ideal outdoor laboratory for the observation and discussion of the taxonomy and ecology of a wide variety of plants and animals. Recognizing this fine opportunity for such studies, seminars in alpine and mountain ecology have been presented in the area and nearby for the past three summers. A third seminar on the taxonomy of Rocky Mountain plants will be added this summer (1965). All seminars are sponsored by the National Park Service, the Rocky Mountain Nature Association, the Institute of Arctic and Alpine Research and the Extension Division of the University of Colorado, the Conservation Education Division of the Colorado State Department of Education and the Estes Park Chamber of Commerce.

In all seminars primary emphasis is placed upon field observations and discussion of the many facets of the plant communities of Rocky Mountain National Park and adjoining mountains. Previous participants have expressed appreciation, as well, for the benefits

they have derived from the exchange of ideas and information among the members of the group. Many of these people have extensive experience in the biological sciences. Some are taking their first formal course in biology. This broad variety of backgrounds is of benefit to all and novices and professional people alike find rewarding experiences within the structure of the seminars.

Each six-day seminar will be held in Rocky Mountain National Park and its vicinity. The major portion of each day will be spent in the field, observing the various features of the communities as they are found in this "living museum." Shorter indoor sessions will follow each day's field activities, where field experiences will be further discussed and illustrated by slides. Distinguished scientists will present evening lectures to complement the daytime activities.

## DESCRIPTION OF SEMINARS:

### FIELD TAXONOMY OF PLANTS:

June 28 through July 3, 1965.

Instructor: Mrs. Ruth Ashton Nelson assisted by Dr. Bettie Willard Scott-Williams

This seminar will deal primarily with field identification techniques and characters of the important families of the local flora. The basic concepts of taxonomy and the principles of identification and classification will be discussed and illustrated. Some attention will be given for those desiring it to lichens, mosses and ferns, in addition to the flowering species seen in the field.

### ALPINE TUNDRA ECOLOGY:

July 5 through July 10, 1965.

Instructor: Dr. Bettie Willard Scott-Williams

Field work of this seminar will center on Trail Ridge, where 10 square

miles of virgin alpine tundra is readily available to the group by car. Topics of discussion will be alpine environment and biological adaptations of life forms and physiology to this extreme environment.

#### MOUNTAIN ECOLOGY:

July 12 through July 17, 1965.

Instructor: Dr. Bettie Willard Scott-Williams

Emphasis of this seminar will be placed on the basic concepts of ecology, primarily succession and climax, as they can be demonstrated in the mountain landscape. The many ecological processes operating within the framework of these two concepts will be demonstrated and discussed. Three different climax regions will be observed extensively — Lower and Upper Montane and the Subalpine.

#### INSTRUCTORS:

Mrs. Ruth Ashton Nelson, M.A., author of *Plants of Rocky Mountain National Park*, has done extensive taxonomic research in Rocky Mountain National Park for several decades, making her well qualified to instruct on the plants of the region. Recently she completed another book on the flora of the Rocky Mountains. She has conducted a number of adult education classes in taxonomy in the Colorado Springs area.

Dr. Bettie Willard Scott-Williams, research associate of the Institute of Arctic and Alpine Research of the University of Colorado, investigated the ecology of the alpine tundra of Trail Ridge for her doctoral dissertation. She also was employed for five years on contract with the National Park Service to study the effects of visitors on the ecosystems of the Park. This is the fourth season she has conducted these seminars. Prior to coming to Colorado, Dr. Scott-Williams spent a year in Europe studying alpine bot-

any with several of the famous ecologists of that continent.

#### FEES AND REGISTRATION:

Fees for the seminars are \$25.00 per week, \$45.00 for two weeks, \$65.00 for three weeks. Registration for the seminars is made by sending the fee to:

Mr. Merlin K. Potts, Executive  
Secretary  
Rocky Mountain Nature  
Association  
P. O. Box 147  
Estes Park, Colorado 80517

Registration for each seminar is limited to 25 persons.

The University of Colorado awards credit of one semester hour in upper division botany per seminar week, if the registration fee of \$5.00 per week is paid *at the opening session* of each seminar attended. *Do not include registration fee* for credit with regular registration fees.

#### PLACE:

All seminars will meet at Hidden Valley Lodge in Rocky Mountain National Park. Field trips will be taken from there. No public transportation is available to and from Hidden Valley Lodge nor are accommodations available there. Participants will pool transportation.

#### ACCOMMODATIONS:

Numerous hotels and motels are available in the town of Estes Park, 10 miles from Hidden Valley Lodge. Estes Park also has many restaurants, stores and garages. List of accommodations will be sent upon receipt of your inquiry concerning the seminars.

Several campgrounds are available in the National Park within 7 to 11 miles of Hidden Valley Lodge.

Further information may be obtained by addressing your inquiry to the Executive Secretary of the Rocky Mountain Nature Association.

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## BOOK REVIEW

DR. HELEN  
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*Exotica* by Alfred Graf (Roehrs Co., Rutherford, N. J.) is an excellent reference book for all gardeners. Since this is a very large and very expensive book, you may not wish to include it in your personal library but you should be acquainted with it. It is available for reference in the Helen Fowler Library at Denver Botanic Gardens.

Three editions have been published. The third and most complete, came out in January, 1963.

*Exotica* is a pictorial cyclopedia of exotic plants. It is invaluable in the identification of plants used in horticulture, both indoors and out. The book has 12,025 illustrations, most of which are black and white photographs

of plants. 291 plants are shown in color.

Maps showing the tropic and subtropic zones of the world, climates of the world and natural vegetation of the world are included. If you would like to know where your horticultural plants come from, study these maps.

Also interesting to the person who wishes to learn more about plants and their origins is a very good section on plant geography. This is well-written and makes pleasant reading.

Descriptions of all plants illustrated, with a key to their care, is an important part of the book. A detailed discussion of the culture of indoor plants is also included. The book features an excel-

lent illustrated section on propagation. An illustrated section on plants in arrangements should give you some good ideas if you are going to plant a "dish garden" or small planter.

Characteristics of the more important families from which horticultural plants come is treated briefly and con-

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Join the Associates  
of Denver Botanic Gardens

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cisely. An interesting simplified family tree to show relationships is included.

Other features of the book include a horticultural color guide and an illustrated glossary of botanical terms.

An index of common names should be very helpful to the layman. This

index gives the scientific name of the plant or plants to which the common name is applied. Since the same common name is often given to more than one plant, this index is helpful in clearing up confusion.

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***We Need YOU!***

Up to this time the Denver Botanic Gardens has operated with only a limited number of volunteers to assist the four staff members and three maintenance men. With the opening of the conservatory and operating greenhouses scheduled for next year, it has become obvious that a large organization is needed to cope with the increasing activities.

Therefore, a **new volunteer organization — Associates of Denver Botanic Gardens — is being formed.** Membership will be open to any man or woman who is interested in the Gardens and wishes to help. Dependable workers are needed for the following activities: 1) to groom the plantings in the Gardens, 2) to guide tours through the various units of the Gardens, 3) to act as hostesses in the House, 4) to assist in the Library, Herbarium, and proposed gift shop, 5) to help with educational programs, 6) to help with stenographic and clerical work, labeling, mapping, and flower arrangements. More information can be obtained at Botanic Gardens House — or you can phone for registration or fill out the membership blank on the following page. Manager of the Associates is Mrs. Chard Smith, Jr. (756-1327), Assistant Manager is Mrs. Graham Morrison (424-0706).

ASSOCIATES OF DENVER BOTANIC GARDENS  
MEMBERSHIP FORM

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Address \_\_\_\_\_

Telephone \_\_\_\_\_ Date \_\_\_\_\_

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INTERESTS

- |  |                               |
|--|-------------------------------|
| _____ Annual Garden Tour               | _____ Gift Shop               |
| _____ Annual Plant Sale                | _____ Library                 |
| _____ B G House (underline)<br>hostess | _____ Mapping                 |
| sewing                                 | _____ Promotion               |
| repair                                 | _____ Editorial Work          |
| office work                            | _____ Others (indicate ideas) |
| flower arrangements                    | _____                         |
| _____ Garden Maintenance               | _____                         |
| _____ Guide Tours of (underline)       | _____                         |
| York Street Gardens                    | _____                         |
| Rose Garden City Park                  | _____                         |
| Trees City Park                        | _____                         |
| Alpine Trail                           | _____                         |

SKILLS

Please tell us a bit of your background; any degrees, special skills, ordinary skills, or whatever brings you to Associates.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature

Mail to: Associates of Denver Botanic Gardens  
909 York St., Denver 80206

# 1964 Membership Roster

## DENVER BOTANIC GARDENS

(Editor's Note: The following list of members is complete as of December 31, 1964. The names of individuals who joined Denver Botanic Gardens after this date will be recognized in the new members list which appears monthly in the *Green Thumb Newsletter*.

Members should check the roster for the correct spelling of their names. Discrepancies should be brought to the attention of Mrs. Helen M. Vincent at Botanic Gardens House. Members should also check to see if the names of their friends also appear on the roster. If they are not members, contact them and extend a personal invitation to join.)

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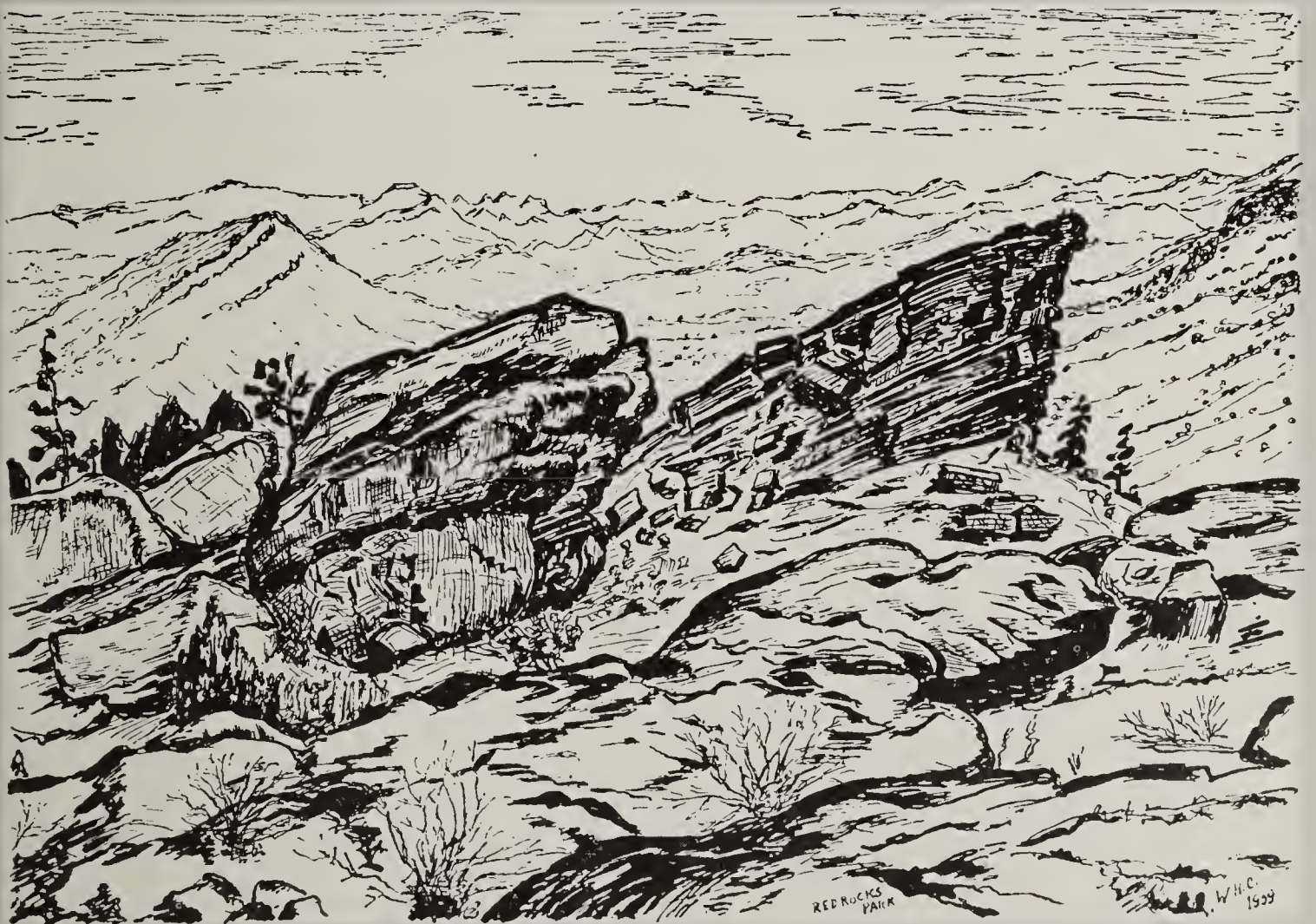


# The Green Thumb

A Publication of Denver Botanic Gardens

MARCH-APRIL

1965



# Attention

## Members of Denver Botanic Gardens and Readers of *The Green Thumb*

**T**HE EDITORIAL COMMITTEE of *The Green Thumb*, with approval of the Board of Trustees of Denver Botanic Gardens, in an attempt to improve the quality of its publication has decided to reduce the number of regular annual issues from eight to six. It was felt that such a reduction will increase the value of the magazine to members by allowing the Committee to use more discretion in selecting material.

It is intended, on occasions when sufficient material is available, to publish one or two special issues each year. These special issues will be designed to deal in depth with one particular subject. At the present time, special issues are being considered which will deal with the subjects of conservatories, general gardening, trees of Denver and rose culture. These special issues will be made available to members of the Botanic Gardens at no additional charge.

The Editorial Committee sincerely hopes that the members of Botanic Gardens will approve of this attempt and that, as a consequence of this change, *The Green Thumb* will become an even more worthwhile publication.

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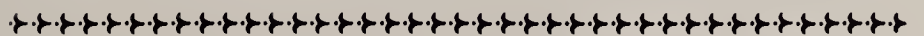
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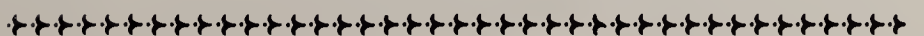
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## THE COVER

RED ROCKS PARK

*Drawing by the late William H. Crisp*



# *Denver's* CIVIC CENTER

WALTER POPPUM

*Member, American Society  
of Landscape Architects*

**M**OST PEOPLE who walk through the Denver Civic Center today undoubtedly appreciate the handsome, open spaces, the enframing architecture, the well-kept flower beds, the beauty of the lawns, the handsome plantings of trees and shrubs and, above all, the magnificent view of the spread of the Front Range from Longs Peak to Pikes Peak. I am afraid, however, that few appreciate the "blood, sweat, and tears" plus the thought and work represented in the final development of this area. Do they realize how fortunate the City of Denver is to have had a few pioneers with the foresight to acquire and develop such an area?

When the American Society of Landscape Architects' Exhibition "One Hundred Years of Landscape Architecture" was held last year at the Denver Art Museum, a large part of the exhibit was devoted to the work of Frederick Law Olmsted, Sr. Mr. Olmsted was famous for his work in planning and developing Central Park in New York City. He also worked on the plans for the Columbian Exposition in 1893, which was more commonly known as the Chicago World's Fair.

He also engaged in the development of the Capitol plan and the city of Washington, D. C. He founded one of the first offices for his profession in the United States in Brookline, Massachusetts. The firm bore the name of the Olmsted brothers and its activities were later carried on by his son, Frederick Law Olmsted, Jr., until his retirement. Much of the work of this office was shown in the 1964 Centennial Exhibition.

After viewing this Exhibition, I felt that a unique opportunity had been missed in not "tying-in" some of Mr. Olmsted, Jr.'s, work in the Rocky Mountain region with the Exhibition. He worked on the Denver Civic Center and also helped in developing the Denver Mountain Parks. Looking from the Art Museum, he could say, as did Sir Christopher Wren, "If you would ask what I have done — *circumspice*" or "look about you," since the Civic Center to which he had devoted a lot of time, effort and enthusiasm, the Denver Mountain Parks and other of his pet projects were all visible from the Art Museum area. These projects remained in my mind and I later spent

some time in the Denver Public Library looking up details of the Civic Center and Denver Mountain Parks planning and also in talking with some of the people who had followed the work here. I think the results of my investigation might be interesting as they illustrate some of the processes by which a project of this sort comes into being.

Chronologically, the beginning of the Civic Center project goes back to the organization of the City and County of Denver through the consolidation of half a dozen smaller municipalities in 1904. This act served to generate much enthusiasm and public spirit for the development of the City as the principal population center between Chicago and the Pacific Coast and its passing from a provincial mining and "cattle town" to a full-fledged metropolis of culture as well as a commercial and agricultural center. A Denver artist of the period, Henry Reed, wrote an article entitled "Proposed Plans for Improving the City of Denver" which was widely approved and enthusiastically backed by Mayor Robert Speer. Accordingly, Charles Mulford Robinson, a distinguished city planner, was invited to come to the City as an adviser on civic improvement. The principal result of Mr. Robinson's recommendation was the designation of a tract of land three blocks long and two blocks wide between the State Capitol and the existing City Hall as a site for a Civic Center.

The 45-degree angle of the meeting of streets in this area was found to make the site inadvisable for development and caused a restudy of the plans. Public sentiment shifted in favor of a plan which took advantage of the mass and elevation of the state Capitol building and the view of the Rocky Mountains to the west. The less visionary residents felt that the ancient and

poorly maintained buildings and the towering hulk of a power house and a fire station, already on the site, were serious obstacles to a satisfactory development of the area.

In 1907 the sculptor, Frederick MacMonnies, came to Denver in connection with the designing and locating of his work, the "Pioneer Fountain". He established support for a new axis directly from the Capitol building west towards the mountains, taking in two blocks between Colfax and Fourteenth streets and three blocks from Broadway to Cherokee streets. This idea gained public support and approval and the land was acquired over a period of five years at a cost of \$1,800,000. This is, generally speaking, the area occupied by the Civic Center today. It speaks well for the governing officials of Denver that they had the courage and foresight to acquire this considerable amount of land for this purpose at this time; a few years later it would have been prohibitive in cost even if it could have been purchased. An interesting sidelight is that east Denver residents were opposed to this spending of public moneys from all of Denver for a project which did not benefit their area and they fought and lost a court battle to prevent it.

Having acquired the site, public opinion was strongly in favor of a development which would reflect the impressiveness of the site and the emerging public role of Denver as the future metropolis of the Rocky Mountain area and a cultural center instead of merely a mining and "cow town." At this time the Chicago opera with Mary Garden and Tetrazini and such other artists as Maude Adams in "Peter Pan" were appearing in Denver and the public sentiment was that for Denver "nothing but the best was good enough." Frederick L. Olmsted, Jr.,

just then approaching the height of his career, was hired to come to Denver and prepare plans for the Civic Center. Olmsted's plan had an open, tree-lined mall through the center leading to the site reserved for the City and County Building and on either side near Bannock street a new public library on the north and an art museum on the south. The boundary of the south side was to be a colonnade while the formality of the whole was to be lessened by plantings of trees and shrubbery and a system of walks. The plan was so arranged as to allow views of the wide sweep of mountains to the west. Somewhere along the line, objections were raised to the amount of his fee and Mr. Olmsted, being convinced of Denver's future greatness and because of his interest in the development of the City, donated his services on both the Denver Mountain Parks and the Civic Center.

The Civic Center plan developed slowly. The decrepit old houses were cleared from the area, the unsightly power house and fire station demolished, the area was graded and drained and work on the planting and walks started. In 1916 Mayor Speer, who had been retired from office during the previous election, was re-elected and immediately began to insist that the Olmsted plan was not what he wanted; he had travelled in Europe, particularly in Germany, was much impressed with German parks and developments and he wanted a large fountain, a tree-lined mall with statues and was quoted as "wishing to plow up all of Olmsted's development".

The contract with Olmsted was terminated and Associate Architect and Engineer-City Planner Edward H. Bennet was given a contract to develop new plans. Bennet's plan introduced a new cross axis from north to south terminat-

ing in an open air theater on the south and the Voorhees Memorial Gateway on the north, both rather heavy architectural features by Marean and Walker. Along the mall was placed a statue by A. Phinster Proctor of "Bucking Bronco" and opposite it one of "The End of the Trail" by Stephen Knight, while at the Voorhees Memorial Gateway, two jet fountains were introduced. The whole west end of the area was enclosed by the bulk of the City and County Building, effectively cutting off any view of the Rocky Mountains. The only part of the Olmsted plan surviving was the planting of trees and shrubbery and the walk system. I recall that in 1922-1923 I was privileged to spend some time in the Olmsted office after graduation from college and on the walls of one of the rooms was a faded, rendered plan of the Denver Civic Center. As a midwesterner I found it hard to accept the prevailing view of the Bostonians that all the people in the territory west of the Hudson river were uncultured and the country undeveloped. I took some comfort in the fact that at this time the Olmsted firm was doing the Broadmoor Hotel grounds in Colorado Springs, the huge Palos Verde residential project in the Los Angeles area and a city plan for Boulder. This was in addition to the work being done for the Denver Mountain Parks. Mr. Olmsted, himself, was very active in guiding the lately formed National Parks system — which seemed to me a refutation of the supposed "corner" Boston had on culture at that period. I remember that at one time Mr. Olmsted told me he had some difficulty in convincing Denver people that any tree save a cottonwood was suitable for planting in a park and insisted that if I were ever in Denver to look at the oak trees in the Civic Center.

Now 45 years have passed since that

time and on the occasion of the Centennial Exhibition of Landscape Architecture it is interesting to remember that back in the first decade of the century Charles Mulford Robinson, Henry Reed, Frederick MacMonnies, Frederick Law Olmsted, Jr. and Edward H. Bennet worked for and left their stamp on Denver's Civic Center. This was at a time when few city planners had the foresight to acquire the necessary land and to develop it. Denver's citizens did and in an article in the long defunct *Architectural Record* of March 1923, Theodore Merrill Fisher calls the Denver Civic Center "An outstanding example of noble deeds greatly accomplished". The years have borne out this evaluation.

One last item of interest: Mr. S. R. DeBoer, the dean of the profession of landscape architecture in Denver told

me an interesting story about the oaks which Mr. Olmsted mentioned to me so many years ago. Red oaks at that time had never been planted in Denver and so there were none available in local nurseries. The original trees came from Meehan's nurseries in Pennsylvania and, since the Olmsted firm always liked to use specimen-size material, large trees were ordered. The box car with the trees in it took an interminable time getting from Pennsylvania to Denver and the trees, although started on their long journey while tightly in bud, arrived in Denver with the buds fully leafed out and quite yellow from their trip in the dark and unventilated car; never-the-less, after being carefully planted and tended and abundantly watered they survived and are still growing on the Civic Center grounds.



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THERE IS MUCH confusion in the taxonomy of garden varieties of petunia. It is impossible to establish their botanical relationships. It might be of interest, however, to the gardener to learn something about the characteristics of this, the most popular of all our bedding plants.

Petunias belong to the Solanaceae or nightshade family. This large family is prevalent in the tropics but representatives also occur in temperate regions. Well-known members which provide food for man, are the tomato, potato and red pepper. Other species in addition to the petunia, such as the Jerusalem cherry, matrimony vine, datura, butterfly flower, cup flower and salpiglossis, are used as ornamentals. Several others possess narcotic or poisonous properties which are utilized by man. Principal among these are tobacco and belladonna.

The genus *Petunia* is made up of annuals and perennials, all of which are grown as annuals in our region. They are characterized by having viciid-pubescent (sticky) foliage; simple leaves; five-lobed, funnel-shaped corollas; and five stamens inserted on the corolla tube.

There are 25 or more species of petunias which are recognized by most botanists. Of these, *Petunia axillaris*, *P. violaceae* and *P. hybrida* are the most important. The first two are both natives to Argentina and when compared to our ornamental varieties they are rather unattractive. *Petunia axillaris* is large with long, narrow, dull white flowers and was once grown as an ornamental. *Petunia violaceae* was also grown as an ornamental for its

# Petunias

BEVERLY M. PINCOSKI

and

JOSEPH W. OPPE

rose-red to violet, short, broad flowers. Neither of these species are of any consequence as ornamentals today. They are, however, important since they were the ancestors of our modern garden varieties.\* *Petunia hybrida* is the species to which all the common varieties of garden petunias are assigned. It is not a "natural species"; that is it did not arise in the wild beyond the influence of man but instead, it was the result of plant breeders' efforts to produce better ornamental plants.

## Petunia Trials

In the April 1961 issue of *The Green Thumb*, Dr. A. C. Hildreth, Director, Denver Botanic Gardens, reported the results of the petunia trials conducted by the Botanic Gardens in 1960. These trials have been conducted for five years and it is intended

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\*Editor's Note: Denver Botanic Gardens hopes to have, in the near future, representative plantings of *Petunia axillaris* and *P. violaceae*.



'Seafoam' Petunia

that they will be an annual feature at the York Street Unit of the Botanic Gardens.

The purpose of these trials was to discover which of the varieties of petunias were best suited for growing here in Denver. Each year, many varieties were included in the trials. Approximately 95 varieties were planted in the 1964 test, 80 in 1963 and 122 in 1960. Data on the two remaining test years was not complete as information on only 48 of the varieties grown in 1962 and 55 of those grown in 1961 was available.

An attempt was made to carry over into the following year's trials all those varieties that had not been properly tested. The ability to accomplish this was limited due to the unavailability of certain varieties during any given year. Many of the varieties which were judged inferior were discarded and each year some of the new ones were in-

cluded. Varieties which had consistently been judged superior for a number of years were sometimes eliminated as it was deemed unnecessary to carry them over into the following year's trials.

The trial beds were arranged in plots, each containing approximately 50 plants of each variety. In 1964 the plots were arranged so that the individual classes (multiflora, grandiflora, balcony and double-flowering) were planted in succession in order to make comparisons easier. An attempt was also made to separate the colors so that no two varieties of the same color were planted together. This arrangement gave the effect of color "banding" and made a very attractive display.

Members of the Botanic Gardens staff judged the trials from many different aspects. The following represent the major criteria on which these judgments were based: (1) Size and growth

habit. (2) The height the flowers are borne above the foliage. (3) Flower size. (4) Number of flowers. (5) Tendency of flowers to fade or bleach. (6) Color of the underside of the corolla tube. (7) Ability of the variety to produce new flowers which cover the old, faded ones. (8) Decorative form of the flowers. (9) Richness and sheen of the flower color. (10) Interesting throat markings. (11) Compatibility of flower colors in the bicolored varieties. (12) Regularity of flower patterns in the bicolored varieties. (13) Contrasting colors of the veins of the flowers. (14) Color and texture of the foliage. (15) Disease resistance.

The following varieties are recommended as a result of the 1964 trials. No attempt has been made to incorporate results from previous years' tests into this report. The following listed varieties proved to be the best of those planted in 1964 and may not represent the best varieties available in any particular class or group.

Best varieties in 1964 by Color Classification:

### WHITE

'Snowdrift' — height 14 inches; bloom size  $2\frac{1}{4}$  inches; multiflora single; white with yellow throat; compact, upright growth; profuse bloomer; forms a uniform mat of color.

'Seafoam' — height 16 inches; bloom size  $3\frac{1}{2}$  to 4 inches; grandiflora single; good flower substance; profuse bloomer.

'White Cascade' — height 14 inches; bloom size  $3\frac{1}{2}$  to 4 inches; grandiflora single; floriferous; best of Cascade varieties.

'Sonata' — height 15 inches; bloom size  $3\frac{1}{2}$  inches; double; good bloomer; has good white color but dead blooms should be removed as they detract from the appearance.

### RED

'Comanche Improved' — height 18 inches; bloom size  $2\frac{1}{4}$  inches; multiflora single; good red color; dead blossoms don't detract; profuse bloomer.

'Tango Improved' — height 14 inches; bloom size  $3\frac{1}{4}$  inches; grandiflora single; is much improved over older variety 'Tango'.

### YELLOW

'Butterscotch' — height 17 inches; bloom size  $1\frac{3}{4}$  inches; multiflora single; pale yellow with darker yellow throat; upright, compact growth; forms uniform mat of color; profuse bloomer.

'Brass Band' — height 15 inches; bloom size  $2\frac{1}{2}$  inches; multiflora single; pale yellow with darker yellow throat; floriferous.

'Yellow Gleam' — height 16 inches; bloom size  $1\frac{3}{4}$  inches; multiflora single; pale yellow with darker yellow throat; profuse bloomer. There is little difference between these three yellow varieties. 'Butterscotch' seems to have a deeper color.

### PURPLE AND LAVENDER

'Purple Waters' — height 20 inches; bloom size  $2\frac{1}{2}$  inches; multiflora single; dark purple, velvety appearance; tall, upright growth; good color and profuse bloomer.

'Capri' — height 18 inches; bloom size  $2\frac{1}{2}$  inches; grandiflora single; medium purple-blue; a new variety this year — seems to be a good one.

'Black Knight' — height 22 inches; bloom size 3 inches; grandiflora single; dark purple, velvety appearance; tall variety, mostly upright; good color; floriferous.

'Blue Ribbon' — height 26 inches; bloom size  $2\frac{1}{4}$  inches; balcony variety — not effective as a bedding type;

dark bluish purple; good color and good bloomer.

'Peppermint'—height 13 inches; bloom size 2 inches; double; orchid; good bloomer; pleasing color; a new variety this year — seems to be a good one.

### MAGENTA

'Plum Dandy' — height 16 inches; bloom size 2½ inches; multiflora single; vibrant color, velvety; dead blossoms don't detract; floriferous; forms colorful, uniform mat; one of the most talked-about varieties this year.

'Mars' — height 18 inches; bloom size 2½ inches; multiflora single; deep maroon-red; good color and no fading; not quite as floriferous as 'Plum Dandy'.

### PINK

'Chiffon' — height 16 inches; bloom size 3 inches; grandiflora single; pale

pink, slight color variations but this adds to appearance rather than detracting from it; full, bushy growth; profuse bloomer.

'Pink Cheeks'—height 14 inches; bloom size 2½ to 3 inches; grandiflora single; large throat area in creamy yellow with pink blending to darker pink at the outer edge; pleasing effect; dead blossoms don't detract; profuse bloomer.

'Pink Desire'—height 18 inches; bloom size 3 inches; grandiflora single; rosy pink with white center; good color with some fading; profuse bloomer.

'Prima Donna Improved' — height 15 inches; bloom size 3 inches; grandiflora single; rose with slightly darker venation; floriferous; is much improved over older variety 'Prima Donna'.

'Pink Magic'—height 15 inches; bloom size 2½ to 3 inches; grandiflora single; deep bright pink with cream

'Cherry Tart' Petunia



center; compact, upright growth; profuse bloomer.

'Radiance' — height 27 inches; bloom size 2½ inches; balcony variety — not effective as a bedding type; deep rose with white center; good color but some fading in older blossoms.

### **CORAL**

'Coral Satin'—height 15 inches; bloom size 2¼ inches; multiflora single; medium coral with white center; compact, upright growth; floriferous; forms uniform mat of color.

'Maytime' — height 13 inches; bloom size 3 inches; grandiflora single; light pinkish coral; large blooms borne well above foliage; floriferous.

'Salmon Magic' — height 16 inches; bloom size 3 inches; grandiflora single; salmon with white center and darker salmon venation; profuse bloomer.

'Lyric' — height 16 inches; bloom size 2¾ inches; double; salmon; good bloomer; some fading of older blossoms.

### **BLUE**

'Blue Mist' — height 16 inches; bloom size 2 inches; multiflora single; light blue with white throat; slight color variation; compact, upright growth; profuse bloomer.

'Mercury' — height 18 inches; bloom size 2½ inches; multiflora single; light blue with cream throat; slight color variation; good bloomer.

### **BICOLOR**

'Comet' — height 18 inches; bloom size 1¾ inches; multiflora single; magenta with white star pattern; color and star pattern fairly uniform; profuse bloomer.

'Elks Star' — height 18 inches; bloom size 1¾ inches; multiflora single; magenta with white star pattern; color and star pattern fairly uniform;

good bloomer; more upright clustered growth habit than 'Comet'.

'Twinkles' — height 14 inches; bloom size ¾ to 1½ inches; multiflora single; deep pink with white star; small blooms in clusters; color and star pattern fairly uniform; cheerful; good bloomer.

'Cherry Tart'—height 14 inches; bloom size 2½ inches; double; rosy pink and white; good bloomer; perky and cheerful appearance; faded blooms don't detract.

### **BLUE AND LAVENDER WITH PROMINENT VEINING**

'Blue Lace' — height 13 inches; bloom size 3 inches; grandiflora single; orchid-blue with deeper blue-purple venation; ruffled blossoms; profuse bloomer with blooms borne well above foliage.

'Sugar Plum'—height 15 inches; bloom size 2 inches; multiflora single; orchid with darker purple venation; compact, upright growth; good color; forms a uniform mat; profuse bloomer.

'Sugar Daddy' — height 14 inches; bloom size 3½ inches; grandiflora single; violet with darker purple venation; large blooms borne well above foliage; profuse bloomer.

'Lavender Lace' — height 12 inches; bloom size 2¼ inches; multiflora single; lavender with darker purple venation; forms a colorful, uniform mat; floriferous.

Two new varieties which were tested this year were very disappointing: 'Heartthrob', a red and white multiflora single and 'Peaches 'N Cream', a pink and yellow multiflora single. In both cases plants were small with very few blooms and the color combinations were drab and unpleasing. Again, this opinion is based on only one year's testing and should not be considered conclusive.



'Comanche Improved' Petunia

### **Petunia Culture and Use**

Petunias are so easy to grow that little need be said about this cultural phase. However, for the information of the novice a few hints on the proper location and preparation of flower beds might be appreciated.

Choose a planting area in the full sun. The petunias prefer full sun although they will tolerate partial shade. If planted in heavy shade, petunias become leggy and unsightly. The addition of organic matter to the soil, in the form of rotted manure, peat or leaf mold, is usually helpful.

The planting date for petunias will depend a great deal on the treatment they receive prior to planting. If they are moved directly from a warm greenhouse or house to the garden then they should not be planted until late in the season, perhaps as late as June 1. On the other hand, if they were hardened-

off by gradually exposing them to outside conditions, then they may be planted as early as May 10 to 15, depending on the season. If the gardener wishes to get a "head start", without taking steps to harden-off the plants, then he must be willing to take the chance of having them killed by a late frost. Individual plants should be located 10 to 12 inches apart, depending on the ultimate height and spread of the variety being planted. Double-flowering varieties may be planted closer together as they do not get as large as most of the single-flowering ones.

Petunia plants can be purchased in the Denver area from about the first part of May until the first of July. A number of good varieties is available and the selection is becoming greater as local nurserymen are now growing many of the new varieties. Some of our

local nurserymen are now relying on the results of the Botanic Gardens trials to aid them in selecting which varieties to grow.

Seeds are available from many local sources for those who do not care to purchase plants. Petunia seeds should be planted indoors around the middle of March. The seeds of double-flowering varieties can be sown earlier, mid-January, as they are slower to start than the single-flowering types. Fill the flat with a mixture of  $\frac{1}{3}$  peat,  $\frac{1}{3}$  sand and  $\frac{1}{3}$  soil. Place the flat in a container of water so that the planting mixture is soaked from the bottom up. Scatter the seed on top of the soil. It is not necessary to cover the seed as they are small and the pressure of watering will be sufficient to force them into the planting mixture. When the seedlings reach a height of approximately 2 to 3 inches, transplant them from the flat to 3-inch pots. (For a complete discussion

of raising plants from seeds, see the March 1963 issue of *The Green Thumb*, "Starting Seeds Indoors" by Helen Marsh Zeiner.)

Except for cultivating and watering, there is little else to do for petunias

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once they are planted. An occasional feeding, with one of the foliar fertilizers, during the growing season may prove helpful. Caution should be exercised when fertilizing as too much fertilizer will cause petunias to become tall and spindly. Spent or faded blooms should be removed as energy needed for the production of seed is better utilized for the formation of new blossoms. If there are large numbers of petunias, the gardener may wish to ignore this step. If varieties were chosen that cover their spent blooms with new ones, this step may not be necessary.

Insects seldom prove to be much of a problem. Occasionally, large populations of aphids may occur but these are readily controlled with applications of D.D.T. or malathion. When applying these insecticides, be certain to follow the manufacturer's directions printed on the container.

When considering how to use petunias for landscaping it is best to keep in mind that they may be used in mass plantings or they can be presented as

individuals or in small groups. Without a doubt, petunias are most effective when displayed in mass plantings in borders or beds. Lovely effects can often be accomplished by planting groups of different colored varieties together so that a color contrast is achieved. The effectiveness of this technique was demonstrated by the favorable comments which the Botanic Gardens' 1964 trial beds received from the public. This effect was enhanced, as previously stated, by alternating contrasting colored varieties. Petunias can also be planted to center attention on the beauty of their individual blossoms. The beauty of the petunia flower is exquisite with the rich color of its corolla tube, the featheryness of the veins of the flower and subtle shadings of the corolla throat. To attract the attention of the observer, present petunias in planters or pots on the porch or patio or in small groups located beside the garden walk. Close scrutiny is necessary to observe this beauty so they must be located in conspicuous and accessible spots.

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# The Landscape Architect's Professional Practice and Basis of Charges

FRANCES NOVITT  
*Member, American Society  
of Landscape Architects*

AT THIS TIME of year you are probably thinking about plans for your garden, the surroundings of your home. You may also be the owner of an industrial or suburban business, the outdoor surroundings of which you know need to be developed carefully to give the greatest possible service in convenience to your customers and employees and the best possible appearance to your place of business. Or you may be the owner or manager of some other type of business in which the best use of land area and outdoor space is a vital part of a successful operation.

It will be of considerable interest to you that the American Society of Landscape Architects has recently made available to its members a pamphlet entitled *The Landscape Architect's Professional Practice and Basis of Charges*. This publication is to be used as a guide and for information by landscape architects and their clients. It defines the practice of landscape architecture and describes in detail each step of the work a landscape architect might have to perform on a

planning project. It also suggests a guide for professional charges, which is not meant to be interpreted as mandatory.

Here is an outline of this publication. It should give you a clear picture of what to expect for your money if you retain a competent, well-trained landscape architect.

## DEFINITIONS

The practice of landscape architecture comprises those professional activities relating to the planning of land areas, arrangement of structures and objects on the land, the design of out-of-door places and spaces and thus the creation of a more useful, safe and pleasant human environment.

The field includes:

- Private properties
- Parks and recreational areas
- Land subdivisions
- Institutions
- Industrial, commercial and housing developments
- Town and city planning

The landscape architect renders a

service to the client (whether an individual, firm or governmental agency) either directly or in collaboration with the architect or engineer, giving consideration to the economical and efficient use of land and its aesthetic appearance. Remuneration for this service is compensation received directly from a client, never a commercial profit on materials or labor.

## LANDSCAPE ARCHITECTURAL SERVICES

While services vary widely with the type of project, they frequently consist of:

- a. Feasibility studies
- b. Site selection:
  - Survey and analysis
  - Overall master land planning
- c. Site planning:
  - Locations of buildings
  - Locations of groups of buildings and other structures
  - Grading
  - Drainage
  - Pedestrian and vehicular circulation and parking
  - Recreation facilities
  - Planting
  - Irrigation
  - Lighting
- d. Supervision of the execution of the work

Included in services are:

- Necessary conferences
- Preparation of preliminary studies, reports, cost estimates, detailed working drawings, specifications, bid and contract agreement forms
- Issuance of certificates of payment

The usual procedure of operation is outlined as follows:

### 1. Preliminary Visit

Inspection of site and consultation with client



Landscape Architects at Work

Possibility of outlining basic development program and determining what types of drawings, reports, etc., will be required

Establish basis of charges for services

Client will be advised as to what information landscape architect will require for the work. This will be supplied at the expense of the client, may be prepared by the landscape architect and will usually consist of:

An accurate topographic survey showing:

- Certified property lines
- Street lines with existing and established (proposed) grades
- Rights-of-way
- Restrictions
- Easements

Locations of all utilities such as sanitary and storm-water sewers

Water, gas and electric lines

Test borings if needed

Location and character of any existing features or conditions of the site such as trees, rock outcrops, etc., which must be considered in properly planning the project

## 2. Submission of Proposal and Contract

The landscape architect will set forth in writing:

Specific scope to be performed by his office

Time of performance

Fee to be charged and method of payment

Information to be furnished others, at their expense

Upon approval in writing of this statement by the client, the landscape architect is ready to proceed to the next step.

## 3. Preliminary Drawings and Estimates

These will be a basis for discussion and conferences with the client to further analyze and evaluate a final solution and may be revised to meet with the client's approval.

## 4. The General Plan

This will record permanently the entire original plan of development; it is especially valuable when development is carried on over a long period

of time. After the client's approval of this plan the landscape architect will proceed to the preparation of detailed drawings, etc.

## 5. Working Drawings, Specifications, Bids, Contract Documents

The client's decision as to the extent of the development to be undertaken at once and his time schedule will establish the type and number of working drawings, etc. They will vary for different projects but in general will consist of most or all of the following:

a. Grading plan:

Showing proposed grades for all structures, ground and water areas and drainage facilities.

b. Site plan:

Locating by dimension all structures, walks, roads, etc.

c. Planting plan:

Showing location and identification of all existing plants to be removed or preserved, all proposed plants to be planted. This includes a plant list

d. Construction details, of all elements of the site plan

e. Irrigation plan:

Showing detailed arrangement of all elements of irrigation system

f. Lighting plan:

Showing complete layout of all elements

The specifications identify all types of materials to be used and set forth explicit methods of construction and installation.

The Bid and Contract Documents

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identify all drawings and documents, establish manner in which bids are to be submitted, basis of contract for the work, price, terms, payments, etc.

## 6. Supervision of Construction

Periodic inspection of the work as it progresses, interpretation of contract documents, recommendations on any changes that may become necessary.

## PROFESSIONAL CHARGES

(The outline of the following is not as complete as that of the first part; the matter of charges being variable. However, here is a listing of the different methods of charging.)

### 1. Percentage of Construction Cost:

It should be noted that the ratio of time spent to the cost of the project is normally much higher for landscape architectural projects than for projects of other design professions.\* Therefore suggested percentage fees would be relatively higher than for architecture and engineering.

### 2. Time Basis:

This includes a flat hourly charge for the landscape architect's time, plus payroll costs times a factor to cover overhead.

### 3. Lump Sum Fee:

The most satisfactory to both client and landscape architect, if it is possible to clearly define the scope of the work and estimate accurately the time and expense involved. An alternate arrangement would be to prepare preliminary plans on an hourly basis or percentage of construction cost; or preliminary plans may be done for a lump sum amount and contract plans and supervision for a percentage of the construction cost.

### 4. Retaining Basis:

Either on an annual basis or as a lump sum payment for one or more of such studies as site selection, feasibility, zoning or land use analysis.

### 5. Other Bases:

Per-unit, for subdivisions, apartments, etc., area-basis for subdivisions; special services, such as separate agreements for technical advice or services from other professions.

### 6. Payments:

Payments for services are usually due and payable upon completion of each stage of the planning service or on a month-to-month basis. Often a portion of the total fee is paid in advance. When fee is on a lump sum basis, it is recommended that about 80% of the total be paid at time of the delivery of completed plans and specifications and that the balance of the fee, including that for supervision, be payable monthly during the construction. If no supervision is to be done, the full fee for completed plans and specifications would be paid at the time of their delivery.

### 7. Termination of Contract, Abandonment of Work and Ownership of Documents:

If the client chooses to terminate his contract with the landscape architect or abandon the project at any stage, the landscape architect shall be entitled to just and equitable compensation for all services performed up to the time of such notification. Unless otherwise stipulated, all drawings, specifications and other data are the property of the landscape architect, whether the work for which they were made is carried out or not.

---

\*Because most landscape design projects are custom jobs. (F.N.)

# The Centennial Of Landscape Architecture In The United States

*One Hundred Years Since  
Olmsted's Design of Central Park*

STANLEY WHITE

*Member, American Society  
of Landscape Architects*

IN THE Denver Art Museum we have just had the handsome Centennial Exhibit of American Landscape Architecture, featuring, in commemoration, the building of Central Park in New York City, by Frederick Law Olmsted. The exhibit was sent here by the American Society of Landscape Architects and the Smithsonian Institute. The ASLA is now well established in our region, with its Rocky Mountain Chapter and a full roster of well-known practitioners. The 62nd Annual Meeting was held at Boulder, Colorado, in 1961.

In this brief account of the influences affecting the maturing of the Colorado landscapes, the earliest recorded note concerning this subject is from my own grandfather, William Hart, one-time pupil of artist Albert Bierstadt. He said he started painting imaginary scenes of the West in stagecoaches in Troy, New York, long before Mark Twain made his famous Civil War-time trip by the Overland Route from St. Jo to Carson City, described in *Roughing*

*It* (1872). While other documents do exist, I must, for briefness' sake, resort to memory; I know that I did draw up planting plans in about 1920 in Olmsted's Boston office for now-existing plantings at the Broadmoor near Colorado Springs. These plans were for Dawson, then a partner in the Olmsted firm and landscape architect for Spencer Penrose. (See the phalanx of the big cedars on the lake side, now 45 years old.) However, a wild account of Charles Eliot's wedding trip to the Antlers Hotel in Colorado Springs (1888) appears in his book *Charles Eliot, Landscape Architect*, bringing the first report of how landscape architects entered the Rockies. His train was wrecked and his clothes burned.

The regional influences on the landscape cannot be overlooked, since people live on the land, invading both town and country. In the National Parks and National Forests landscape architects have long been active.

In this region, Arthur Carhart was with U. S. Forest Service before writ-



(The photographs which accompany this article are scenes of the Centennial Exhibit of Landscape Architecture which was held at the Denver Art Museum in 1964.)

ing "Planning for America's Badlands" and is now consultant to the Denver Public Library's new conservation collections. The landscape comes in for treatment by many professionals. Highways here are significant and beautifully done. F. W. Cron of Denver, engineer for the Bureau of Public Roads, is an honorary member of the American Society of Landscape Architects. Dr. A. C. Hildreth, distinguished former Director of the U.S.D.A., Cheyenne Experiment Station, has guided us in the ecological recognition of the soil, water and plant complex in the arid west, the key to our "high plains". Andrew Larson of Denver, his friend and pupil, became Consultant Land-

scape Architect for the State of Wyoming.

The urge for water control and irrigation engineering has sometimes resulted in sinking little streams and picturesque canyons beneath big pools, but these support life on the land. Wealth comes from mining which destroys the beaver creeks but supports industries, communities and horse racing. It helps bring big buildings and a forest of crude advertising signs that rise against the skyline so that we will soon have to leave town to see the mountains.

Early pioneers in landscape design like S. R. DeBoer, Irvin McCrary and Walter Pesman saw to it that trees

grew in the Denver "desert," giving pleasant shade while they reached up into the mountain view. Many people in city management, such as Mayor Robert Speer, were advocates of parks, boulevards and plantings. Many local nurseries grew the plants most likely to thrive here, bordering the streets, boulevards and even the alleys with spruces, junipers, irises and roses.

Very early, the geologist, Clarence King, later to be first in charge of the U. S. Geological Survey and author of *Mountaineering in the Sierra Nevada*, came through Colorado from California on the "40th Parallel Survey" (see Denver Public Library maps). In a log cabin near Denver he met, by chance, the writer, Henry Adams and John Hay, statesman, diplomat and author; from this meeting grew a lifelong

friendship. Also appearing in Denver chronicles is the story of the English world traveller, Isabella Bird, who came to Estes Park, mounted a horse

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to help with the roundup and later recounted the incident in *Lady of the Rockies*, a wild story. Enos Mills, now a surveyor, dwelt in the "Rocky Mountain Wonderland" and also wrote of this event.

Architects left their mark handsomely such as in the Red Rocks Theater by Burnham Hoyt, in the Italian rustic Boulder campus by Charles Klauder, this theme now being understandably carried through in the current Sasaki landscape plan and in the majestic Roman colonnades of the Civic Center by Edward D. Leonard of Chicago. Glass is king in Denver now, giving a bright glitter among old red sandstones about to fall down; but our climate and our youth are generous to things modern and it begins to domi-

nate the scene in town. New books by landscape architects on the design of the city are by Garrett Eckbo, who has been here on the notable Aspen Design Conferences and Lawrence Halprin, who is presently reworking San Francisco. John Simond's book *Landscape Architecture* and Dober's *Campus Planning* illustrate significant policies of urban treatment.

Tourists, as well as hunters, fishermen and campers, are attracted by our scenic beauty and, no doubt, exert a great influence on architectural development and always will. They pay moneys, do some damage but appreciate the wilderness, with a large measure of satisfaction in what the landscape architect seeks to provide. Richard Brillantine is representative for land-

scape architecture in the new U. S. Bureau of Recreation in Colorado, which combines Parks and Wildlife under the director, Robert Tucker.


Some of the other state and government offices which employ landscape architects in this area are the F.H.A., the Bureau of Indian Affairs, Ent Air Force Base in Colorado Springs and the State Parks, under the State Game and Fish Department.


Automobiles have been taking over mind, heart and life of most people to their vast pleasure but at imponderable cost. We were not ready for them in cities already built and if Denver seems to be dying at the core and bursting at the seams, this is probably true in all cities which suffer from "automobiliphilia". This is a malignancy that strikes the culture like cancer in the blood stream, destroying as

it grows. We do not know the cure. But we do know that parking lots scalp the green lawns and that the trees die of drouth without water. Greenery is an index of the biologically sound habitat of society as well as of vegetation. The city imperceptably becomes a petrifact — not blood but stone — says Spengler. And always the desert is inexorable, never ceasing its struggle to regain lost supremacy. (I have found native yucca seeded into a crack in the sidewalk on 13th Avenue, just below Sherman Street, not to mention tumbleweed on many unkempt street corners.)

Denver has its Citizens' Planning Board and the efficient planning office, with Robert E. Giltner, trained landscape architect, as Assistant Director. The design of Denver parks has been under the direction of landscape architects Edmund Wallace and Edgar John-

**THE LANDSCAPE ARCHITECT AND THE CITY**

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son. A friend of landscape architecture is Olga Jackson, Editor, whose articles on our work appear in the *Denver Journal*.

But the weight of influence is carried by the several active offices from which the professional landscape architects go out into the cities, counties and remote regions, preserving the wilderness and cultural essence by studied design, stamping the soil with efficient plans, well fitted through the technique that Professor McHarg calls the "Noblest Art."

Pioneering in a hundred designs for subdivisions that have developed the Denver communities have been Gabriel Harman, formerly with the F.H.A., and Robert O'Donnell of the Urban Land Institute; likewise Sam Huddleston, whose prior experience has been on highways for the National Parks Service, with a wide variety of consulting. The newest office is Gerald Kessler's. Through the years, the loveliest gardens have been designed by Jane Silverstein Ries and Julia Andrews. Spring garden shows have been planned by Chris Moritz.

It is heartening to hear that the University of Colorado at Boulder has started a new Department of Landscape Architecture with Sam Huddleston appointed to do the teaching in the current semester. This innovation can be classed as one result of an inspiration over 100 years ago to Frederick Law Olmsted, Sr., of "Saving the world through landscape architecture."\* The ghost of this fantastic thought is still hovering over the land

and bearing fruits beyond his wildest expectations. We must carry on.

\* "—Olmsted's work symbolizes his generation's dedication to democracy. His contribution was in relating the form and function of the land — the nation's most priceless inheritance — to the physical and social needs of a democratic society." ". . . Fundamental to his thinking was the conviction that the nation's democratic purpose could be fostered — as well as measured — by a physical design which alleviated social tensions. The task he assigned himself was the re-fashioning of the American landscape so as to realize this national purpose. He did complete his work in his lifetime; we shall not in ours. But he posed a challenge which, one hundred years afterwards, remains as compelling for us as it was for him."—Albert Fien, "Parks in a Democratic Society," *Landscape Architecture*, October 1964, p. 25-31.

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# Culinary Herbs In The Vegetable Garden

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**T**O COMPLETE your vegetable plot, to add flavor to the foods you grow, plant culinary herbs. Culinary herbs are those plants which are used to add distinction and variety of taste to salads, hot dishes and beverages.

In growing herbs it is our aim to produce aroma and taste in that portion of the plant which is used for flavoring. At least half a day of sunshine, good drainage and good garden loam is required to accomplish this. Herbs need little attention after planting except for the usual weeding, cultivating and watering. Low humidity is good for drying herbs but not for growing them. Such dry conditions cause the herb plants to produce few leaves, mature quickly and to set seed too early.

Our local soils are often low in humus and very alkaline and a neutral soil or one slightly acid will grow herbs best. To offset this alkalinity, organic matter can be added to the soil before planting each year and supplemented with the addition of plant food when necessary. Two or three cuttings can be made during the summer if fertilizer is added after each harvest. Plant roots need to be insulated by applying a sufficient surface mulch to keep the soil cool in hot, dry weather. Sawdust mulch, if aged, can be used very beneficially as a side dressing.

Perennial herbs can withstand considerable heat and drought but tender annuals such as basil and marjoram will not flourish under these conditions.

Often, irrigation along the row, in addition to the overhead watering given the vegetables, will increase production of the annual culinary herbs. Fortunately, insects rarely attack healthy herb plants and, as a matter of fact, various herbs are now being used experimentally in an infusion to replace poisonous insecticides.

Perennial herbs can be grown from cuttings, divisions, from seed planted early in the greenhouse or cold frame or from seed planted later in the spot they are wanted. Two to four plants each, of most robust herbs, may be all that will be needed for the average family. They can be situated along the border of the vegetable garden or at the end of the vegetable row in a location where they will not be disturbed each year. Tarragon does not set seed and must be grown from cuttings or divisions.

Parsley, which is a biennial, should be replanted yearly or allowed to re-seed itself. It should be planted in early spring from seed soaked in water for 12 hours and once established, is difficult to transplant. You will like the flat or plain leaf parsley for use in salads and with vegetables. It is not as decorative as the curly leaf but has more flavor.

Chives, garlic and shallots require almost the same attention as onions but give a variety of flavor and mature at various times. Shallots need extra moisture.

Seeds of annual herbs can be planted in the Denver area after May 15th when the soil has become warm and danger of frost is over. Cool nights will delay germination. Basil planted as late as July 1, 1964, produced the best plants and produced two heavy cuttings of leaves before the frost killed the plants. Late herb plantings could replace such vegetable crops as radishes and lettuce.

Sow the seeds of annual herbs in shallow rows, cover lightly with soil and shade with burlap or other material until germination. Pinch the tops of basil and marjoram to increase branching and produce sturdy plants. The shade of a taller row plant can benefit the annuals if the garden is in full sun. Basil is a good companion

plant to tomatoes, which it is used to flavor. Purple basil is useful in making herb vinegars.

A few dill seeds sown along side the asparagus bed will provide green leaves and seed for pickling. Summer savory is a good partner to beans, which it is used to flavor.

Harvest herb leaves just before the plants bloom. Use the leaves and green tips or thoroughly dry the stems and leaves and later strip the dried leaves and store them in jars.

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## THEY'RE NOT ALL BAD

DR. FRED N. ZEINER

WHILE MEAT AND GRAVY constitute the preferred diet for many of us, there are some misguided souls who claim merit for salads and vegetables. Whatever the preference in menu, flowers on the table are said to enhance one's ability to take on more calories than the doctor ordered. From calories to aesthetics or rare T-bone to limp lettuce, insects may have entered the picture. Would someone please pass the honey, so that these hot buttered biscuits will be edible?

We usually think that all insects should be swatted. This is true in two respects: 1. If it is on your dinner plate (but even then it would have nutritive value — insects are an important part of the diet of many primitive people). 2. If you play the percentages. Two-thirds of all insects are detrimental to man in that they feed on plants which are directly or indirectly of value. One-fourth of all insects can be considered beneficial in the sense that they feed on the above-mentioned detrimental

types. This leaves one-twelfth to be accounted for. The "robbers" and the "cops" have been mentioned. The remaining types are detrimental because they, in turn, feed on the "cops".

Perhaps we should learn to swat discriminately. As there are about 1,000,000 named and described species of insects, this project could become even more challenging (and much more worthwhile) than the daily crossword puzzle.

More importantly, let's relax and enjoy the little rascals. "Bugs" can be fun. Many are beneficial and it is always pleasant to see friends. With a sharp eye, the behavior and antics of these small critters are much more entertaining than TV. And, if you are worried because all your efforts to control the "robbers" seem futile, look at the coin of the realm — "in God we trust." With patience your problem may be solved by the "balance of nature" or climatic conditions catastrophic to the forms bothering you.

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# The 1964 International Holland Bulb Selections

THE 1964 International Holland Bulb Selections have been announced by the Netherlands Flower Bulb Institute. The selections are made by an international jury of bulb experts and specialists on the basis of a poll of springtime visitors made at the world's largest bulb garden, the Keukenhof, in Lisse in Holland.

The 1964 selections of the "most admired varieties" include nine tulips, one hyacinth and one daffodil:

## TULIPS

- Triumph Tulip . . . 'Blizzard'
- Darwin Hybrid Tulip  
..... 'Red Matador'
- Double Late Tulip  
..... 'May Wonder'
- Parrot Tulip . . . 'Blue Parrot'
- Kaufmanniana Tulip  
... 'Goudstuk' ('Goldpiece')
- Darwin Tulip  
..... 'Sweet Harmony'
- Cottage Tulip . . . . . 'Halcro'
- Lily-flowered Tulip  
..... 'Queen of Sheba'
- Gregii Tulip  
..... 'Red Riding Hood'

## HYACINTH

- Hyacinth . . . . . 'Marconi'

## DAFFODIL

- Daffodil . . . . 'Dutch Master'

'Blizzard' is a magnificent, large, creamy white flower that lives up to its name in the effect it provides when planted in solid masses. It belongs to the Triumph class and is a sturdy tulip standing 16 to 18 inches high. The Triumph tulips bloom in mid-season, just after the early varieties and just ahead of the Darwin Hybrids.

'Red Matador' blossoms in a vivid orange-red which also has a touch of crimson on the outside petals. This very handsome flower, a perfect example of the Darwin Hybrid class, blossoms in mid-season.

'May Wonder' is a member of the Double Late tulip (peony flowering) class and has a large flower of delicate rosy pink. This graceful tulip when planted in masses presents a magnificent rich display in the garden.

'Blue Parrot' is a magnificent tulip and is actually a bright violet in color, formed by a natural mutation of the Darwin tulip, 'Bleau Aimable'. It is an enormous tulip on a sturdy stem with



'Dutch Master' Daffodil



'Goudstuk' Kaufmanniana Tulip

a delightful frilled outline and is one of the best examples of the Parrot class.

'Goudstuk' ('Goldpiece') is a perfect example of the early flowering Kaufmanniana tulip which has a large blossom with exceptionally broad petals. It blooms in a deep golden yellow with a crimson red inside on stems from 12 to 16 inches. This charming variety is greatly appreciated because it is one of the earlier flowering spring blossoms.

'Sweet Harmony', a Darwin tulip, is uniquely colored in lemon-yellow, edged with ivory white. It is excellent both as a garden variety and as a cut flower.

'Halcro' is a Cottage tulip with an oval-shaped flower on a tall strong stem. A beautiful variety for the gar-

den, it has a very large bloom in carmine red with bright orange-scarlet inside.

'Queen of Sheba' is an exquisite tulip of the Lily-flowered class. It is a perfect example of the elegant shape to be found in the tulips of this class. The reflexing petals are long and finely

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sculptured. This long-lasting flower is a luminous bronze-red color with an orange tinted edge.

'Red Riding Hood' is a large hybrid of the Gregii class, vividly colored in scarlet with a black base and an exterior of carmine-red. A highlight of this particular tulip is its most fascinating

dark, bronze-purple, mottled leaves, which spread out in a circle underneath its blossom.

'Marconi' is a wonderful, bright, deep-rose hyacinth, sometimes shaded with a rosy white. It has a large broad spike, borne on a stiff stem making it ideal for garden use.

'Dutch Master' is a beautiful Trumpet daffodil which blossoms in a rich golden yellow. It is excellent both for the garden and for forcing, because of its sturdiness and perfect form.

To have a 1964 International Holland Bulb Selection garden, the bulbs, which are available throughout the U. S., should be planted in the fall. The planting and care of bulbs is so simple and bulbs cost so little, that all gardens should have at least a few of the selections on display.



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Whatever bulbs you select, remember that fall is the time to plan and plant your spring garden. To extend your garden and the spring season, add to and complement your International Holland Bulb Selections with other varieties and with minor bulbs, many of which will bloom even before the last snow has melted. Then, when spring sets in, you can sit back and enjoy your own International Holland Bulb Selection garden.

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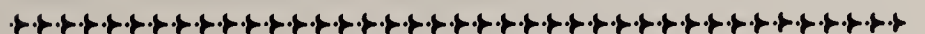
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## THE COVER

Flowering crab apples in bloom along Speer  
Boulevard.

Photograph by  
Mr. Edmund W. Wallace



# Save Your Garden For Another Day

PATRICIA C. BALL

“Gather ye rosebuds while ye may  
Old time is still a’flying,  
And this same flower that smiles today  
Tomorrow will be dying.”

Robbert Herrick 1591 — 1674

The poet, Robert Herrick, was not offering advice to gardeners who wish to preserve their blooms for a wintry season but, rather, was encouraging young maiden ladies to make the most of time. Nevertheless, the linking of time and the flower is most important to those of us who are interested in using preserved material for arrangements. Even at this time, although it is early in the season, there are some flowers or leaves that are now at their peak of perfection and which could be harvested for drying. Next fall, it will be too late to acquire dried materials unless generous friends are willing to share part of their harvest. Of course, it is possible to send to Williamsburg, Virginia, for one of those pre-packaged dried bouquets that are indeed quite charming; but with consistent, not burdensome, effort the same results may be achieved with almost no cost. In fact, it is possible to improve on the pre-packaged bouquets as these are really quite skimpy and often lack many elements that are needed for a handsome arrangement.

Take time now to decide what colors would be suitable for collecting, keeping in mind the decor which will influence their selection. People tend to think of dried arrangements as either Colonial or Provincial in effect but this need not be the case. The change to purer line arrangements with less emphasis on mass, a simple container and use of texture contrast will provide the Modernist with a handsome piece. When it has been decided what colors are needed, the next decision to make concerns what new materials should be grown to supplement those gathered from the common varieties of plants. Remember that the colors of preserved flowers will never be exactly the same as when they are fresh but will be pleasantly muted, some to greater or lesser degree. The lovely, dark red rose will be almost mahogany or royal magenta, depending upon whether it was an orange-red or a blue-red when fresh. Pinks deepen and “blue”. Whites turn ivory and yellows intensify. The deeper-colored yellow and orange flowers take on brown hues. Green leaves, depending

upon their method of preservation, may range from celadon-green and moss-green to almost brown-black. It will be wise to save some leaves separately since flowers cannot be preserved with their leaves which are a necessity in nearly all arrangements. They offer a natural contrast to the blooms.

Having decided what raw materials are needed, do not be disappointed if perennials alone cannot do the job; consider the humble annual flowers which usually have a greater profusion of blooms. All of the large seed companies offer a wide selection of colors and types of flowers. There are always available many annuals which can be planted this year and new perennials to try next year. Caution: read the cultural instructions; nothing is more dismaying than reading, on a fine spring day, that certain seeds need freezing to germinate and that they should have been planted last fall. When choosing flowers, be sure to take into account variety in shape as well as color. Spikes, such as those of the larkspur, delphinium, salvia and veronica should be included. Daisies and other composites with ray flowers will add an interesting touch of lightness to arrangements. Roses, peonies, asters, daffodils and tulips will add bulk to bouquets. Certain fruits, such as those of the pyracantha, mahonia and rose, will also provide bulk as well as texture. Since

most people know which annuals and perennials thrive in Colorado or have access to George Kelly's excellent book, *Good Gardens in the Sunshine States*, it is probably not necessary to list all the flowers which can be dried successfully. With the help of borax-and-cornmeal or an excellent commercial preparation called Flower-Dri, almost any flower can be preserved. The following lists are made up of those plants which are easy to dry and flowers which preserve nicely are listed by color. Do not be limited by these lists but experiment to find other materials which will provide handsome specimens. After each of the listed plants are initials indicating the methods of preservation advisable for each type of color. Thus, *F* indicates Flower-Dri; *B-C*, borax-cornmeal; *G*, glycerin; *H*, hanging; *U*, upright and *P*, pressed. Each method is described later separately and in detail. At the risk of causing this article to resemble an advertisement for Flower-Dri, it is advisable to use this commercial preparation when in doubt or when an especially nice color is desired, for time is of the essence and the silica powder formula dries the flowers quickly enough for a minimum deterioration of color and plant bulk.

**BLUE FLOWERS**

- Bachelor's button .....B-C, F
- Caryopteris (blue sage) .....H, U, F
- Delphinium, larkspur .....F, H, P
- Myosotis (forget-me-not) .....F, P



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Scabiosa .....F, B-C  
 Statice (limonium) .....H, U

**YELLOW FLOWERS**

Calendula .....H, F, B-C  
 Celosia (plumy) .....H, U  
 Columbine .....F, B-C, P  
 Daffodil .....F, B-C  
 Goldenrod .....H, U  
 Marguerite .....F, B-C  
 Rose .....B-C, P  
 Snapdragon .....H, F, B-C  
 Statice (limonium) .....H  
 Tulip .....F  
 Yarrow .....H, F, U  
 Zinnia .....H, F

**PINK FLOWERS** (Remember they darken)

Rose 'Duet', 'Rosenelf' .....F  
 Larkspur .....H, B-C  
 Lupine .....F, H  
 Monarda 'Croftway Pink' .....F, P  
 Painted daisy .....F, B-C

**WINE, MAGENTA AND MAHOGANY FOLIAGE** (Any foliage that is red when fresh will deepen to these shades)

Eucalyptus (from the florist) .....G  
 Purple-leaf plum .....G  
 Red barberry .....G

**WHITE FLOWERS AND FOLIAGE** (See other lists for names of flowers that also occur in white)

Baby's-breath...H (small pieces)...F, B-C  
 Bachelor's button .....F  
 Bleached grasses (from the winter wayside) .....H, U, P  
 Lunaria (St. Peter's penny, honesty, money plant) .....H  
 Matricaria (double and single) ....F, H, U  
 Pampas grass, bleached (from the florist) .....H, U, P  
 (Some of these can be bought but try growing your own, stake while green for curves, allow to ripen in the garden but watch for mildew. Double the amount of white flowers saved.)

**GREEN THINGS**

Artichokes (spread open with paper pills).U  
 Caryopteris seed heads .....H, F, U, B-C

Delphinium seed heads .....U, H  
 Dock (gather by the side of the road).U, H  
 Eucalyptus (from the florist) .....H, U  
 Ferns .....P until nearly dry—then U  
 Iris seed pods .....H  
 Ivy vines, whole pieces; 'Baltic' preferred .....P, F  
 Meadow rue seed heads .....H, U  
 Mimosa foliage (from the florist) ....U, H

**ORANGE FLOWERS**

Bittersweet .....H, U  
 Marigold .....H, F, B-C  
 Wild milkweed .....H, F, P  
 (Most flowers in yellow list come in orange and bronze as well. Remember that the dried color will be several shades darker than the fresh flower.)

**RED FLOWERS** (closest to spectrum)

Dahlia (must be red-orange) .....F  
 Dianthus 'Bravo' .....F  
 Heuchera (coral bells) .....P, H, U  
 Monarda 'Adam' .....F, P  
 Rose 'Tropicana' and other scarlet and vermilion shades.....F, singles P  
 Salvia, scarlet .....P

**BROWN, TAN AND BEIGE** (Materials gathered after frost from garden and roadside. Keep an eye open for texture and line. Gather early as these will become bleached by snow and sun — which is alright, too.)

Cockleburr .....U  
 Dock .....H, U  
 Fall leaves .....G, H, U  
 Iris pods .....U

**PURPLE SHADES** (It can't be helped but many flowers will 'purple' anyway.)

Celosia .....H  
 Globe amaranth .....H, F, B-C  
 Lilac .....F  
 Monarda (Oswego tea) .....H, U, F  
 Siberian iris .....F

Before describing methods, it should be pointed out emphatically that the time to start is now! Save twice as

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many flowers as you think you will need! Pick before ripe! Pick when dry! Regarding the first rule, the flowers will shrink and some will break, although some petals may be glued back onto the stem. As a flower matures, it is more apt to shatter, become soft and relaxed or too fully open to be shapely in appearance; this applies especially to roses. Grasses to be dried green should be gathered early in the season. Pick flowers from noon on, weather permitting. They should be free from dew but not sunburned; Colorado afternoon showers tend to spoil the evening picking, so gather material early.

### METHODS

H or U — The easiest way to save flowers and leaves of large size is to hang them upside down in a dark, airy place where husbands and children won't disturb them. Strip all of the leaves from the stalks and tie tightly or they will shrink and fall out of the loop. This method works very well for all material that is not "fleshy" and for which straight stems are desired. If curved stems are needed, place them upright in a container which will allow the stems to bend over the edge. This works very well for delphinium, statice and other plants with foliage that is of a rather dry nature. Be sure to make enough curved materials; it is nearly impossible to bend stems that were dried straight. Flowers that are dried in this way may shrink more than if put into Flower-Dri but the color will be adequate and the flower not too distorted. It is the only way to dry a lot of material or pieces that are quite large, such as baby's-breath.

G — The glycerin method is not as difficult as it may sound. It is chiefly used to preserve woody materials such as eucalyptus, barberry and similar specimens; such stems are less apt to shatter and the leaves remain soft and

leathery in texture if preserved with glycerin. However, be prepared to see this material change color, usually to autumnal shades of mahogany and richest bronze. Obtain glycerin from a druggist and mix with quite hot water ( $\frac{1}{3}$  glycerin to  $\frac{2}{3}$  water). Make enough solution to submerge  $\frac{1}{4}$  of the total length of the material. Next, pick the material and working fast, so that the stems do not dry out, mash the bottom 2 inches of the stem with a hammer so that absorption will be more complete. Leave the material in the glycerin until the uppermost leaves feel leathery. Eucalyptus leaves simply dried are a soft green; done early in the season in glycerin, they become an unusual dark, blue-green; done later in glycerin, they will turn to a pretty, rusty claret. Red barberry dried early in the season is almost spectrum red; dried later, it becomes an almost autumnal purple, brown or eggplant color. Another good subject for glycerin is mahonia; try it at different seasons for interesting results.

B-C—Borax and cornmeal (or plain 20 Mule Team Borax) is used to dry a flower that is rather fleshy in order to preserve the shape. Examples: daffodil, tulip, dahlia, daisy. Fill a container with a mixture of  $\frac{1}{3}$  cornmeal and  $\frac{2}{3}$  borax to a depth of 2 inches; next, place the bare-stemmed flower face down in the mixture. If it is a flat flower such as a daisy; the stem need not be covered. Otherwise, remove all but about 1 inch of stem, place the flower face up in the mixture and carefully and slowly sift the mixture around the bloom. It is best to do this in some place where the container will not have to be moved as even the shifting of the borax can distort a delicate flower before it is dry. Drying will take only a few days, even for big flowers, in this climate; do not over-dry flowers as they

will become too brittle and, in some instances, the borax burns out delicate colors. In general, the borax method is quite adequate for the bulk of the drying work.

F — Flower-Dri is best used for red, pink and white flowers where an especially clear color is desired. It is expensive to buy but it can be used and re-used indefinitely. Follow the instructions on the label; the actual usage is similar to borax. When doing spike flowers such as snapdragons, try putting them in a long, narrow box, such as a cereal box, in an upright position and sift the Flower-Dri around them. Flowers should be checked and removed as soon as dry. In most cases, in our dry climate, this would be in about two days. When drying large stems, such as those of delphinium, it is a good idea to invest in the gallon-size can of Flower-Dri which will do one large cereal box-size of flowers.

P — Pressing flowers is quite easy to do by placing them between the pages of heavy books such as telephone books, catalogs and magazines. It is

helpful to carry such a book in the car to preserve any materials found on trips into the country. Large items can be placed between newspaper sheets and weighted with boards or slipped under a corner of a rug where there is no traffic. When dry, in about a week, pressed flowers can be used in many different ways, such as in picture arrangements or imbedded in liquid plastic. If curved lines are needed, take time while the materials are soft to arrange the plant parts in the desired fashion. Pressing is the best way to preserve ferns for arrangement use.

For more exact and detailed information on the treatment of specific flowers, refer to these two excellent books:

*New Ways With Dried Flowers*, Ruth Gannon, Viking Press, 1958. Available at the Denver Public Library.

*The Complete Book of Dried Arrangements*, Raye M. Underwood, M. Barrows, Inc., 1953. Available at Denver Botanic Gardens Library, where there are other excellent books on this subject.

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# The Associated Story

DUSTY "MILLER" SMITH

PRIOR TO THE formation of the Associates of Denver Botanic Gardens, it was becoming evident that Denver Botanic Gardens was developing into a very large scale operation. The 1964 Annual Plant Sale, for example, exploded into the largest, most successful and completely hectic activity which has thus far been launched. By taxing the efforts and ingenuity of the Botanic Gardens staff and overworked volunteers, it became the catalyst which activated the formation of an organized group of volunteers — the Associates. Thus the "seed" was planted.

Unlike most "seeds", this one required several months of brainstorming before it germinated. The summer of 1964 was spent in deciding how a volunteer organization could best benefit Denver Botanic Gardens, finding recruits and in making trial runs. The neophytes weeded a bit, planted and cared for the Botanic Gardens House grounds, snipped dead blossoms, cultivated the roses, trained a few guides to conduct tours, helped in the library and trained hostesses to greet visitors. Interspersed with these activities, were many meetings at which the conversation flowed freely; debates over the pros and cons of how this organization should operate led to a lengthy "ball



Gift Shop

game" with rules and regulations, from which emerged the by-laws. The "plant" was developing and it assumed an aspect of hardiness when, in September of 1964, the Associates of Denver Botanic Gardens became an official organization.

Since then, the "plant" has branched and grown rapidly. Its membership has grown from the original eight instigators to approximately 120 hard-

working volunteers. These members comprise a heterogeneous group. They vary widely in ability from novices to skilled experts in many fields; in capability from the avid digger to the more tranquil indoorsman. They differ, also, in that many have time available only occasionally while others contribute

long, regular hours to whatever tasks they have assumed. Because of these differences this "plant's" branches are many and not similar in appearance. Some "branches" — no, to be truthful — most "branches" are straggly, since there are not enough volunteers as yet to make them strong and complete. In time they will grow sturdy because they have a good foundation. So, while it may be a weird looking "plant", it has a wonderful goal — to help Denver Botanic Gardens in any way possible wherever needed.

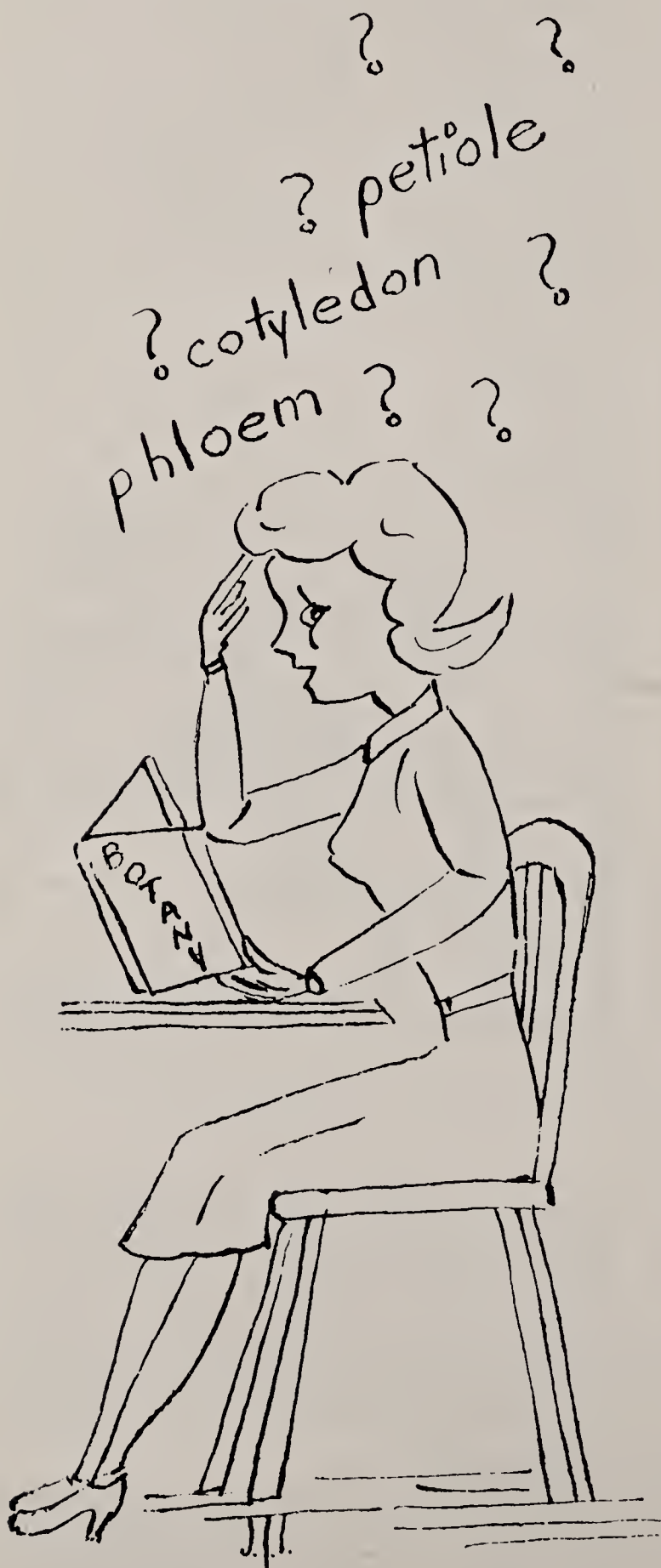
The following is a list, with brief descriptions, of the many projects in which the Associates are involved:

1. THE ANNUAL PLANT SALE. This is a well-known, long established project. Volunteers do 99% of the work involved. They organize, scrounge, persuade, order, buy, dig, pot, sell, explain, count, lug, laugh and cry to get this show on the road.

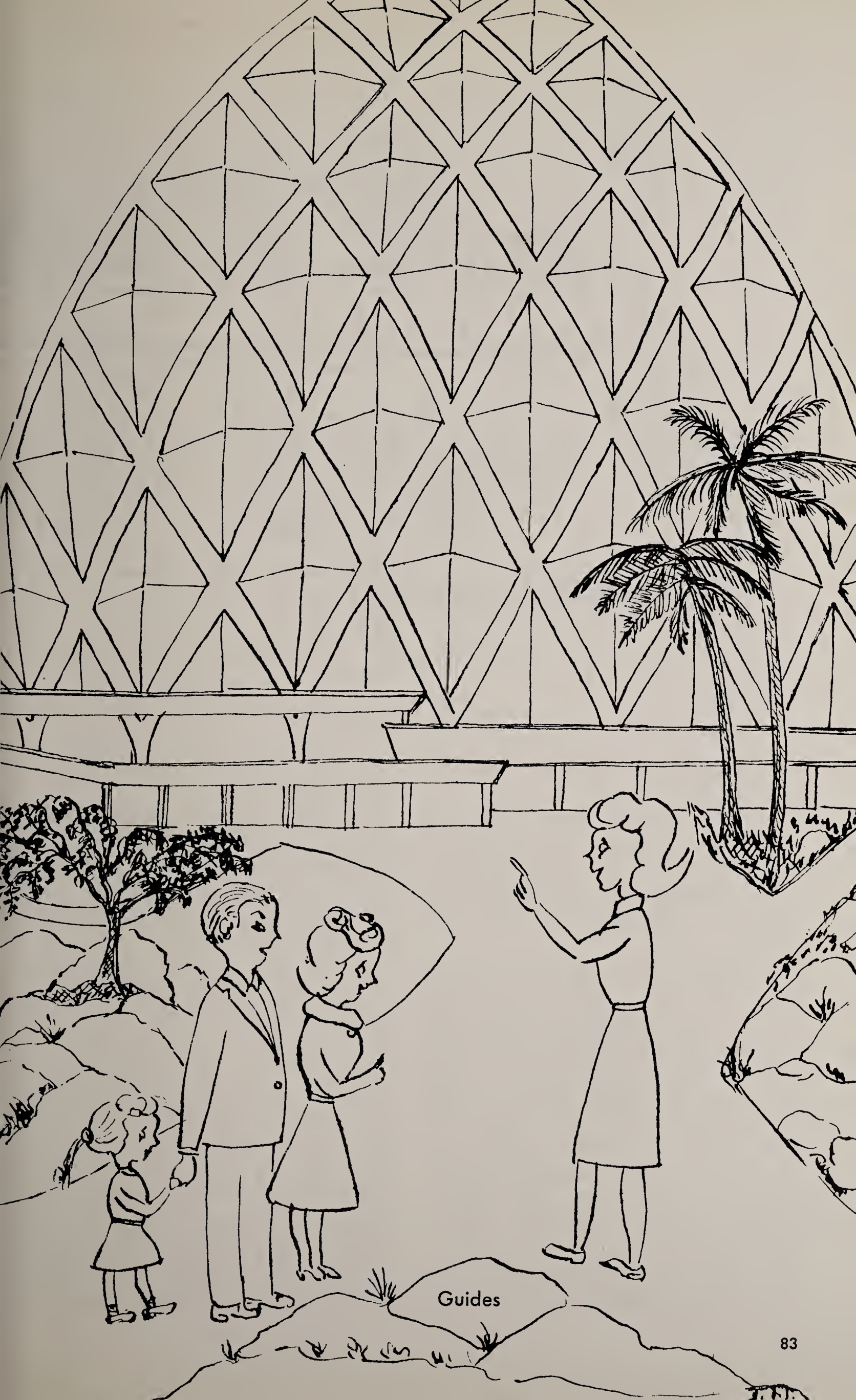
2. THE CHRISTMAS TEA was inaugurated early last December. It was a silver tea for which Botanic Gardens House was beautifully and appropriately decorated. The "silver" designation refers to an invitation to guests to place a cash offering in strategically placed receptacles. The first "million" is yet to be achieved in this fashion but the hospitable atmosphere was reflected in the relaxed attitudes of the many people who attended the tea. An enormous amount of work was required to decorate Botanic Gardens House, serve and sell items which were available from the new Gift Shop.

3. THE ANNUAL COLORADO GARDEN & HOME SHOW EXHIBIT involves designing, preparing and building the Denver Botanic Gardens booth in the Denver Coliseum and, of great importance, staffing this booth while the Show is in progress.

4. Several committees function in



Botany Classes



Guides



### Annual Plant Sale

the operations conducted at Botanic Gardens House:

a. THE LIBRARY, HERBARIUM AND EDUCATION COMMITTEES are all of long-standing. The membership of these committees has been swelled by Associate volunteers and more are needed.

b. Each hostess is expected to spend three hours (or one-half day) each week at the Botanic Gardens House to guide visitors, answer questions and assist the staff in any way possible. At present, the hostess on duty doubles as a saleslady for the Gift Shop.

c. Offshoots, but not members of specific committees, are those who can do office work; some may stitch a frayed curtain; still others can wield a paint brush or make minor repairs.

d. There is a group in training for assistance in editorial work which may

be of future value to the existing Editorial Committee.

e. THE FLOWER ARRANGEMENT COMMITTEE consists of several skilled arrangers who beautify Botanic Gardens House with their artistry. Qualified people are urged to offer their services to this committee.

f. THE GIFT SHOP is supervised by a committee of eight ladies who meet monthly to discuss ideas, vote on purchases, consignments and donations and generally oversee all aspects of this business. Handcrafted gifts are created by talented people either in their own homes or in the Gift Shop Workshop which holds a creative session on the first Thursday of each month at Botanic Gardens House. At present, the Gift Shop is a one-case, one-pegboard business. Plans for the future include moving to the conservatory when it is

completed and a business expansion should ensue.

g. THE PROMOTION COMMITTEE project involves collecting news on lectures, courses, sales, committees, etc. and getting all information to the right sources for publication.

h. THE MEMBERSHIP COMMITTEE tasks involve both the promotion and "selling" of Denver Botanic Gardens. The general public is not as aware of the Botanic Gardens as it should be, so this committee proposes a continual campaign conducted through the medium of neighborhood coffees and other friendly, informal meetings at which a qualified speaker will explain the activities, aims and needs of Denver Botanic Gardens.

5. Out-of-doors, two large committees work vigorously during the summer. Their activities dwindle during the winter months. These include:

a. The maintenance crew performs various tasks, depending upon the plants or beds needing attention. The roses present a constant need for grooming. The weeds are a never-ending problem in all areas of the Botanic Gardens and require many man-hours for control. Measuring test plantings, mapping beds or gardens, planting the grounds around the Botanic Gardens House and some other similar chores are tasks which cannot be regularly scheduled. They are dependent upon the whims of nature.

b. THE TOUR COMMITTEE consists of guides who have been trained to conduct tours through the York Street Unit. This group will eventually be trained to conduct tours of the City Park Unit and the Alpine Unit. The guides must be able to explain the features of the Units in an interesting and understandable manner for adults as well as young people. Last year, the response from the public school system

to the announcement that tours were available by appointment was very enthusiastic. This interest is expected to increase this year. Many of the Associates are taking the course in basic botany and review of the plant kingdom presented by Mr. Joseph Oppe in order to prepare themselves to do an informative job when conducting a tour.

There you have the "plant", "*Associatus splendidicus*" or "*weirdificus*". Simply stated, the people in the group are trying to do all of these things. It must be obvious that a mere 120 people cannot accomplish perfection in all of these areas. The Associates is an organization helping to fill a need and is in great need of more help. It is open to all and all are welcome. This weird little "plant" will grow in one way or another but to "bloom" it really needs you!



Maintenance Crew

# Shellshock Reminiscences of A BURMT\*

MARY TROWBRIDGE

ANY PRECONCEIVED notions a "Rocky Mountain Transplant" may have had about his ability to garden can be quickly blasted after a few seasonal skirmishes in our mile-high region. I should have sensed that the battle conditions were different from the norm to which we were accustomed when we arrived in Colorado during the fall of the year. I can well remember anticipating with delight my first encounter with mountain aspen. How pretty the yellow background would be, high-

\*Bewildered and Unsuspecting Rocky Mountain Transplant.

lighted by flaming red maple trees. My disappointment at not finding maple trees turning red deepened to perplexity when I discovered that I could not even identify a red maple in the whole area.

This baffling mystery was a trifling blow to my ego when compared with my suffering over the hilarious reception I received the next spring when I embarked on a search for tomato stakes. Although not claiming any great knowledge of flower culture, I do know how to grow vegetables and

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I have a blue ribbon to attest to my prowess for growing the biggest, reddest tomato of any ten year old at the Village Victory Garden in my home town. To my surprise I discovered that the local hardware stores and lumber yards did not carry 6 to 8-foot lengths in tomato stakes. All claimed that these stakes were certainly stock items but could produce nothing longer than a 5-foot stick which I deemed scarcely adequate for staking a lupine. My patient explanations that I didn't care for dwarf or cherry tomatoes and had planted the taller-growing varieties evoked the aforementioned hilarity. My fruitless quest had a bitter finale, however, for my first planting was incredibly buried under snow and the May crop was harvested by rabbits before it showed its first fruit.

That year I suffered yet another humiliating defeat in my garden, this time to the elements. Assuming that it was always "going to rain tomorrow," I very cleverly postponed watering from day to day, feeling that it was of more vital importance to wash and air-dry the laundry on a bright, sunny day. By the Fourth of July, when every washable household item, including the blankets and slipcovers had been given the fresh air treatment several times over, there was nothing left growing in the garden to require watering.

The truth about my lack of cultural knowledge was beginning to dawn upon me and I began casting inquisitive glances at neighboring gardens to see if I could learn the magic formula for plant survival in this strange new world. Eventually, I condescended to read an article on hardy plants for this region. Annual larkspur appealed to me as being just the proper height for a small bed to the right of the front door. I congratulated myself for hav-

ing picked such a suitable location for this deep blue variety of larkspur. However, four years later I was not so complacent, for I was still spraying with weed-killer the pale-faced descendants of that ill-chosen planting; they had taken over the gravel driveway. It must be admitted, though, that a front yard completely covered with larkspur is unique in landscaping technique.

Having discovered that larkspur would grow in gravel, I surmised that there must be other flora which could survive in the strange soil surrounding the house. Soil, earth, loam, whatever name it bore, has always conveyed to my subconscious mind the impression of something black, moist and earthy-smelling. So, what was this substance in which I was trying to grow plants? It was as hard as rock, drying to powder, gray to yellow in color and seemed more suitable for a potter's wheel than for a planting medium. In my native terrain, it was important to apply a heavy dosage of lime to the lawn each spring — in Colorado, I find this is the last thing a lawn requires. How could I possibly woo nature in such an alien land?

I have other shattering recollections: from grasshopper invasions to a snow-covered battlefield littered with broken, leafy limbs on one memorable Labor Day weekend. However, I have gained some knowledge in my struggle with nature. I learned that the nostalgic "Tumbling Tumbleweed" is in reality Russian thistle, which at one time threatened to overrun my yard. No longer quite as bewildered and unsuspecting, I have accepted this challenge. I know that others have conquered in their battle with Colorado cultural problems and I have the will to be a victor, too. Perhaps I may not be a transplant much longer.

# New Signs at the Alpine Unit



For several years, the Alpine Unit of Denver Botanic Gardens, located on Mt. Goliath, has been enjoyed by the trained and amateur botanist as well as by the casual observer. This year, through the efforts of Mrs. Walter B. Ash, Dr. E. H. Brunquist, Dr. Helen M. Zeiner, Dr. Moras L. Shubert and Mr. Joseph W. Oppe, several new signs will be placed along the M. Walter Pesman Trail, which traverses the Alpine Unit. It is hoped that these signs will increase the interest, understanding and appreciation of alpine and subalpine vegetation.

This project is being carried out in an attempt to make the novice more aware of the plants of the tundra area and the environmental forces that act upon them. Any suggestions for improvement would be greatly appreciated!

In addition to these large, explanatory signs, small markers will be placed at individual plants along the Trail. These markers will include the common and scientific name of the plant and the family to which it belongs.

The new explanatory signs will cover such topics as the ecology of the alpine area, timber line, the geology of the Mt. Goliath region and alpine grasses. All the signs will be illustrated with attractive and accurate line drawings prepared by Mrs. Walter B. Ash. (See the center spread for examples of these line drawings.) The main display case, located at the upper parking lot, will contain an extensive colored and pictorial representation of the plants found throughout the area.

The following is an example of the type of descriptive material which will appear on the signs. This material was prepared by Dr. Moras L. Shubert and describes some of the ecological factors affecting the plants in the tundra area:

---

## ECOLOGY OF THE TUNDRA

The permanent dwellers of the tundra are plants and animals which are able to store enough food during an eight-week summer to satisfy their needs for the remaining 44 weeks of the year. Alpine tundra climate is the most severe on earth with the exception of desert climate. It is even more severe than Arctic climate because its days are shorter during the growing season. Dominant features of tundra climate are: (1) Rapid drying of plants and soil from near-constant winds; (2) Freezing temperatures during much of year and frequent during the short "summer"; (3) Temperatures ranging from hot to cold in a matter of minutes, depending upon sunshine; (4) Intense ultra-violet radiation because of "thin air" (this is what gives you a quick sunburn up here).

Plants in the wind-swept areas are ground-hugging mat species which may be very old, even though small. PLEASE HELP PROTECT THEM! In areas sheltered from wind are the meadows of grasses and colorful flowers. Willow bushes and even misshapen spruces and firs may be found above timber line in the more protected spots.



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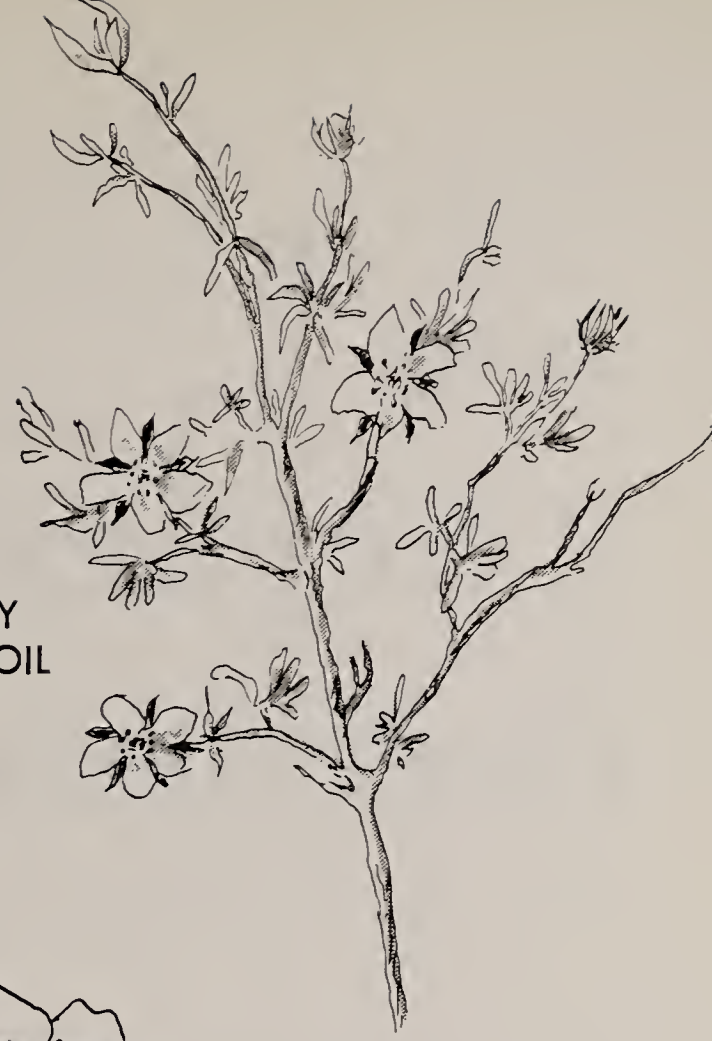


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# Terrace and Garden Tours

**Wednesday, June 23rd**  
**10:00 a.m. — 5:00 p.m.**

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**THE DENVER  
BOTANIC GARDENS GUILD**

JUNE 23rd is coming quickly, which means plans are well underway for the 1965 Terrace and Garden Tour. This is one of the events of major interest to gardeners in the Denver area each year and numerous committees are busy working to assure an exciting event for everyone.

Eight gardens have been selected and each provides definite features of interest to all — the variety in each is most intriguing. For the intimate formal touch with statuary set off by evergreens, one can start with the garden of Mrs. Alfred C. Hicks, 120 Lafayette Street. Next to visit is the Mr. and Mrs. Donald Robertson garden, 39 Dahlia Street, where the emphasis is on an older garden abounding with perennials.

Mr. and Mrs. David Touff, 47 South Ash Street, provide a contemporary garden, a good variety of trees, shrubs and plants and numerous architectural features. Mr. and Mrs. Donald Campbell, in the Polo Grounds, will show what can be done with a newer garden in one of Denver's most attractive residential areas.

At 3036 South St. Paul Street, Dr.

and Mrs. Max Kaplan offer an informal rock garden, mosaics and sculptures and many ideas for easy outdoor living. A real change of pace is the unique grouping for four houses in Southern Hills built around a swimming pool. Each garden is distinct in its own right and the contemporary architecture and landscaping is outstanding.

For the Japanese touch, there is Dr. and Mrs. Howard Suenaga's garden with its stunted pines and water flowing over pebbles and rocks. The Erle Kistler's garden features a sweeping expanse of lawn accented by colorful splashes of annuals, roses, tuberous begonias and a variety of evergreens.

This year for the first time, the overall responsibility for the Tour rests with the Denver Botanic Gardens Guild. It is counting heavily for support from all the garden clubs within

the Denver Metropolitan area and especially on all of you who are members of the Denver Botanic Gardens.

Tickets are \$3.00, tax deductible and can be purchased by calling any of the committee members. Buses will leave from the Botanic Gardens House, 909 York Street, at 10:00 a.m. and 2:00 p.m. (price \$1.00).

If each member of the Denver Botanic Gardens will buy at least two tickets, this tour will prove to be one of the best scheduled thus far. A wonderful job has been done in selecting gardens and they abound with new ideas — whether for planning a completely new garden or displaying new

varieties of plants. Circle the date: Wednesday, June 23rd; call your friends and start making plans for a fun day. Light refreshments will be served.

This year's committee includes: Mrs. Richard A. Kirk, chairman (777-5868); Mrs. Charles Saunders, co-chairman; Mrs. Mackintosh Brown and Mrs. Schuyler Gray, garden selectors; Mrs. Robert L. Davis, signs and supplies; Mrs. Thomas Payne, refreshments; Mrs. Charles Arnold, tickets (777-9404); Mrs. R. L. Davis III, hostesses; Mrs. Peter Neidecker, buses; Mrs. Hardin Holmes, Mrs. Paul Hicks and Mrs. Robert Guthrie, publicity.

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## Mr. BIBEE

### *Joins Our Staff*



MR. ERNEST A. BIBEE, who joined the staff at Denver Botanic Gardens on February 1, 1965 as Superintendent of the Claude K. Boettcher Memorial Conservatory, comes with a very impressive record in the field of tropical plant culture. Just prior to his arrival here, Mr. Bibee acted as Horticulturist at the Missouri Botanical Garden Climatron for 3½ years and lectured in the Botany Department at University College, night division, at Washington University for 1½ years.

To his early college training Mr. Bibee added many years of study, teaching and business experience in the fields of botany and horticulture from which he emerged with a vocation for which he is maturely qualified.

He received his B.S. degree in Education at North East Missouri State Teachers College, Kirksville, Missouri in 1940 with majors in Biology, Agriculture and General Science and a minor in Chemistry. As a means of earning a livelihood while attending college, he operated the college green-

house and one of the college flower gardens. In 1941 he studied botany on a part-time basis at the University of Southern California in Los Angeles while employed in the aircraft industry.

Mr. Bibee was called into military service in 1944, trained in California, Hawaii and the Mariana Islands and saw action with the infantry on Okinawa in 1945. Returning to civilian life, he resumed his horticultural pursuits where they had been interrupted and, after 3 years attending U.C.L.A., he received his M.S. degree in Subtropical Horticulture in January of 1949.

Subsequently, he developed his knowledge and skills in his chosen field through teaching and by employment with companies engaged in business of a horticultural nature. He taught Agriculture, Science and Mathematics in the Los Angeles City Schools for 1½ years and later moved to Seaford, Delaware where he taught Vocational Agriculture for 3 years. The next move in his interesting saga took

him to Sarasota, Florida, where for 5 years he worked for a landscape nursery which dealt in tropical plants.

The opportunity to apply his accumulated knowledge and skills came with his appointment as Horticulturist at the world-famed Missouri Botanical Garden Climatron where he successfully worked for 3½ years. As noted in the beginning of this article, he also taught at Washington University for a portion of this time.

Mr. Bibee is married and his wife Elsie and three children, Martha, Faye

and John will join him in Denver after the closing of the school season in St. Louis, where Mrs. Bibee teaches remedial reading.

The public, in general, and Denver Botanic Gardens, in particular, are indeed fortunate to have secured the affiliation of such a knowledgeable person as Ernest Bibee. A sincere hope is extended here for a long and pleasant association with him and his delightful family. Add a note: his sense of humor will make you pause for a short mental re-take.

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# FLOWERING CRAB APPLES

S. R. DE BOER



**E**ACH YEAR as the warm, spring sun entices flowering things into bloom, it is delightful to look at the flowering crab apples in Denver, where they may be seen in abundance. What a gay splash of color they bring to the drab city picture! As though enchanted, the City has doffed her winter garment and stands revealed in a new spring dress, a radiant picture to behold. "Springtime in the Rockies" means crab apple blossom time to me.

This was not the case many years ago when Denver was still of "school-girl" age. Mother Nature always gave her a new spring dress to be sure but it was a sedate one. The hue was then a delicate green, never gay and colorful. Now this "girl" has matured and

here she stands bedecked in charming rose and red adornment.

In her growing years, a half-century ago, this Denver "girl" was jealous of her sister Capitol in Washington, D. C., where long avenues had been planted with double-flowering cherry trees from Japan. Denver must also be hostess to such beauty decreed Mayor Ben F. Stapleton, a man who added much to Denver's cultural development. Hundreds of the double-flowering cherry trees were planted but, disappointingly, none survived.

Later, however, a pink-flowering crab apple was found flourishing in a corner of Washington Park near the statue of Wynken, Blynken and Nod. This discovery led to the mental query:

“Why not try growing these as a substitute for the cherry trees?” Action followed the thought and two city blocks along Downing Parkway were subsequently planted with a deep purple strain of the Japanese flowering crab apple (*Malus floribunda*).

Since there was no certainty that these trees would grow and since the flower-hungry Denver “girl” had her eye on this activity, we played it safe by planting late lilacs (*Syringa villosa*) between the crab apple trees. This planting was a success. The crab apple trees proved to be perfectly hardy and flourished except for minor injuries sustained from lawn mower impact and a seige of scale insect.

This success stimulated the courage to plant other varieties of crab apple trees. After experimenting successfully with the lighter-hued ‘Hopa’ crab apple, we switched to many other varieties. Our formerly conservative Denverites were delighted with these innovations and began enthusiastically supplementing the “new dress” look in many areas of the City. So many of the ‘Hopa’ crab apples were planted shortly thereafter that a distinct crash was created in the market for these trees. They were actually sold out over the entire country for the next few years.

Denver is now a full-grown “woman” who has filled out her contours admirably but her youthful dress of red and pink and purple flowers is just as eye-catching as when she was a “girl”.



Flowering Branch of ‘Hopa’ Crab Apple

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## Some Notes on

# Home Landscape Planning

FRANCES WHITE NOVITT,

*Member American Society  
of Landscape Architects*

### I. HAVE A PLAN TO FOLLOW

#### **The Importance of a Plan**

Planning your complete home means making many decisions about both your house and garden. Making all the decisions together is making a complete plan; it is the best way because each decision affects all the others. It is just as important to have a plan, whether you have an older house with an established garden, a new house with no garden or, best of all, if you are going to plan the house and garden together.

#### **What a Home Landscape Plan Should Do**

Complete home planning has been defined as a project for complete control of the space we live in, both indoors and outdoors, as well as for complete control of the things we see and “. . . the use and maintenance of that space and those things.” This is for the purpose of “. . . developing the best possible surroundings for family life, individual work and relaxation.”\*

In more detail, a landscape plan should provide a front yard which will set the house apart from public streets and walks and which will add to the appearance of the neighborhood but not to the point where it spoils the rest of your property for other uses. Access to your house should be pleasant and friendly but separate from other areas of activity. If there must be automo-

\*Eckbo, Garrett, *The Art of Home Landscaping*, P. 43

bile access and storage in the front, it should be convenient but should not take over the whole frontage. If your general living rooms are in the front part of your house, as they are in most houses, you might find it is not the most ideal arrangement. These rooms should be placed to open onto the largest part of the lot, which should be developed for general outdoor living. This area would be screened from public view and portions of it should be screened from extremes of climate. Here, obviously, it pays to correlate house and garden design. Some remodeling in an existing house might be necessary to obtain maximum results from your property.

The work areas of the house should be near and have easy access to the outdoor spaces set aside for general service and utility. These should be accessible from other garden areas but screened from them.

The private areas of the house, such as bath and bedrooms, should have at least a pleasant outlook into the garden or a distant view and, at the most, each room might have its own small private garden for sunbathing and relaxation.

If it is possible to consider the fusion of both indoor and outdoor aspects of the same types of activity, along with all the other important considerations in home planning, you will get the most for your space and money and maxi-

mum comfort, convenience and beauty.

### **Who Should Make Your Landscape Plan**

The quickest way to get a good plan is to hire a competent landscape architect to do it for you. If you have the time and interest you might try doing it yourself. It will take more time and effort than you anticipated but if you do research and study the subject you will find it a rewarding experience and you might learn some new skills.

## **II. HOW TO MAKE A HOME LANDSCAPE PLAN**

### **Write a Program**

Make a list of all the things you need in your house and garden—your home—as well as all the things you would like to have. Note any changes which might take place in later years, such as additions to the house, perhaps a swimming pool. Note your resources, your capabilities; for example, decide how much maintenance you really want to have.

### **Make a File of Ideas**

Collect photographs, clippings, magazine articles, books, etc., on landscape designing and gardening in this area. Read some of the excellent books written by our contemporary landscape architects on home landscaping. Appropriate design ideas fit almost any climate but read all you can on gar-

dening techniques in the Rocky Mountain area, for these differ considerably from those in other parts of the country. (See the bibliography.)

### **Make a Survey of Existing Conditions**

Make a carefully measured survey of your property on a large piece of paper, to a convenient scale such as:  $\frac{1}{4}$  inch equals 1 foot. On this base map you must show everything on the property: all buildings, walks, drives, easement lines, property lines, all plants you intend to keep, etc. You must also show the gradient of your property, the up-and-down of it, the high and low points. The books on landscape design will give you a complete list of items and how to measure them.

### **Area Relation Studies**

Establish a rough size and shape for all the items on your list which you want to incorporate into the landscape plan and on a sheet of tracing paper laid over the base map, sketch out some diagrams showing the relationship of these to the house and to each other. This may be easier to do on small size sketches, just a few inches square but in the same shape as your base map.

### **Detailed Design**

After locating the areas for different uses, the detailed design begins. You

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must decide how to develop all the areas, what form to give them, what materials to use, etc. You will see that these decisions are inter-related and should all be made together in connection with the over-all plan. Here is where your research and study will help you. Read the books written by professionals and take courses on landscape design when available. You will learn about design principles, why they are important and how they can help you design your own plan; you will learn about relationship between materials, their different advantages, when to use them, etc.

#### **The General Plan and Details**

After all these decisions have been made and drawn up, you may want to make detailed plans for certain features or areas in the plan in order to work out more complete details and construction. Such items as an irrigation system, lighting plan or grading plan, if these are needed, will probably require some professional help.

### **III. CONSTRUCTION**

The simplest and most expensive procedure for the owner, is to delegate all of the different types of construction work and planting to a very competent landscape contractor. Such a contractor might be hard to find, however, so you might let out various types of the work separately to different contractors; you might also buy the materials and do the work yourself, if you feel you are skilled enough to handle it.

### **IV. MAINTENANCE**

Throughout your designing you should gear your plan to the maintenance you are able to do or have done for you. It is better to design a low maintenance garden rather than an elaborate garden you cannot take care of properly.

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This is only a partial list. Look for other publications at your library and book store. Some can be requested by mail.

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# TERMITES

## In Your Timbers?

DR. FRED N. ZEINER

*Professor of Zoology,  
University of Denver*

**O**R MERELY ANTS in your pantry? A biologist frequently receives this question. It matters not if his special field of interest is anywhere from house plants to space physiology.

Inability to distinguish ants from termites causes needless fear. Most specimens submitted are ants (bothersome as they may be); of the few termites seen, the majority are probably more interested in dead bits of wood or other cellulose-containing material in the soil than in your favorite wooden leg.

Before calling a professional exterminator, make sure that the little critters are termites, not ants. If they are termites, don't worry unless they seem to be more interested in your beams, studs or flooring than in the great out-of-doors. Out-of-doors they are better than the average compost heap.

Call a professional by all means, however, if there is evidence that they have invaded your domicile. Only a professional can then *safely* convert your abode into a lethal gas-chamber for the rascals.

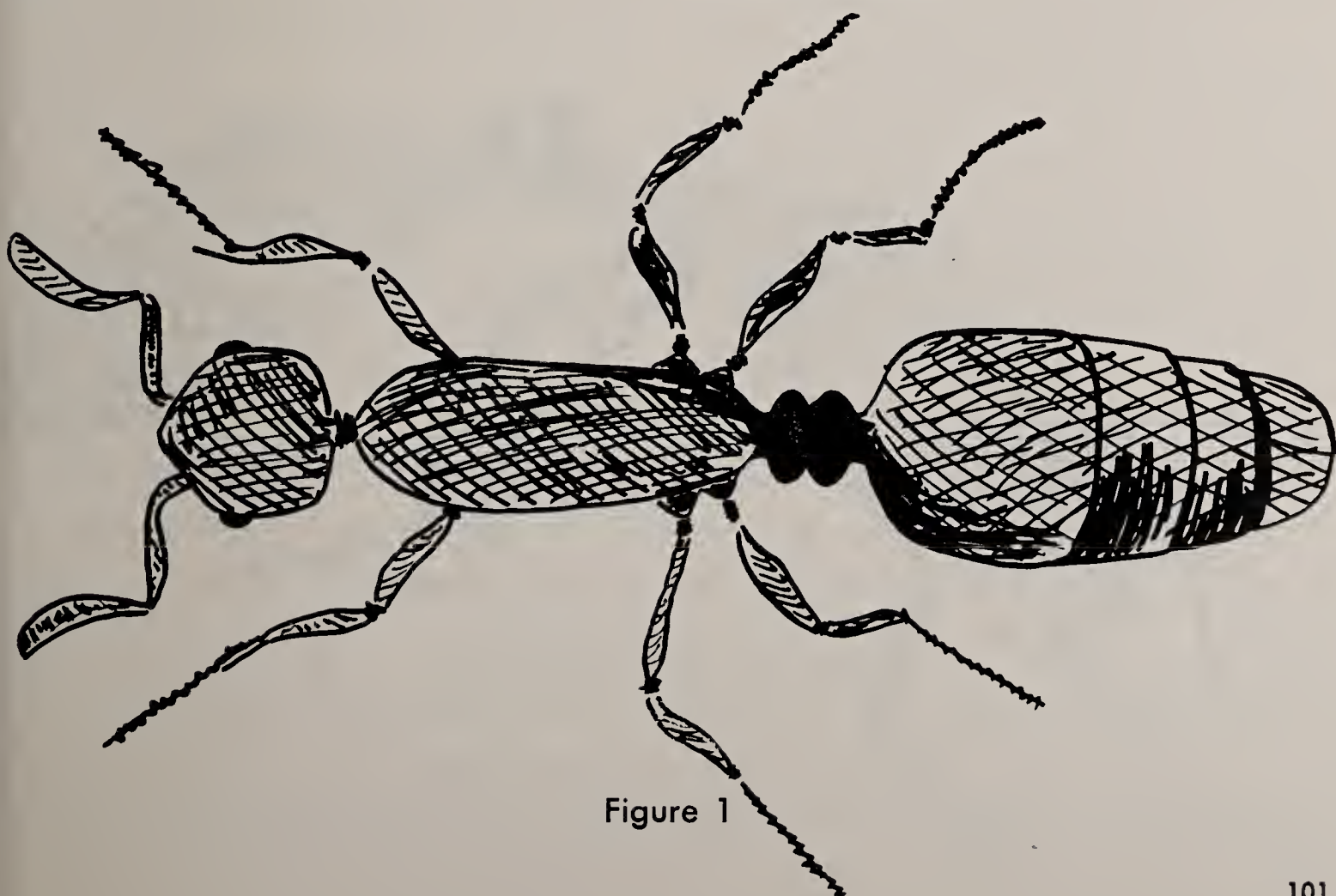


Figure 1

How may ants be distinguished from termites? They are both small, varying in color from white through red, brown and black. Sizes are about the same and there are winged and wingless forms of both.

Ants, being related to wasps, have a very narrow waist (between thorax and abdomen) (Figure 1), in contrast to termites in which general body thickness varies little throughout their length (Figure 2). Neither can bite the calloused fingers of a green-thumb type enough to matter, so pick them up and take a close view. If still in doubt, look at the waist from a side view (Figure 3) (Magnification may be necessary here). All ants have a spike-like projection or two toward the "top-side" in the waist area.

Whatever you find, standard insecticides, applied according to instructions, are worth considering. Ants are a nuisance in or out of the house. Termites "in-house" should be eradicated. Outside, they are harmless and may even be of some use in breaking down dead plant materials.

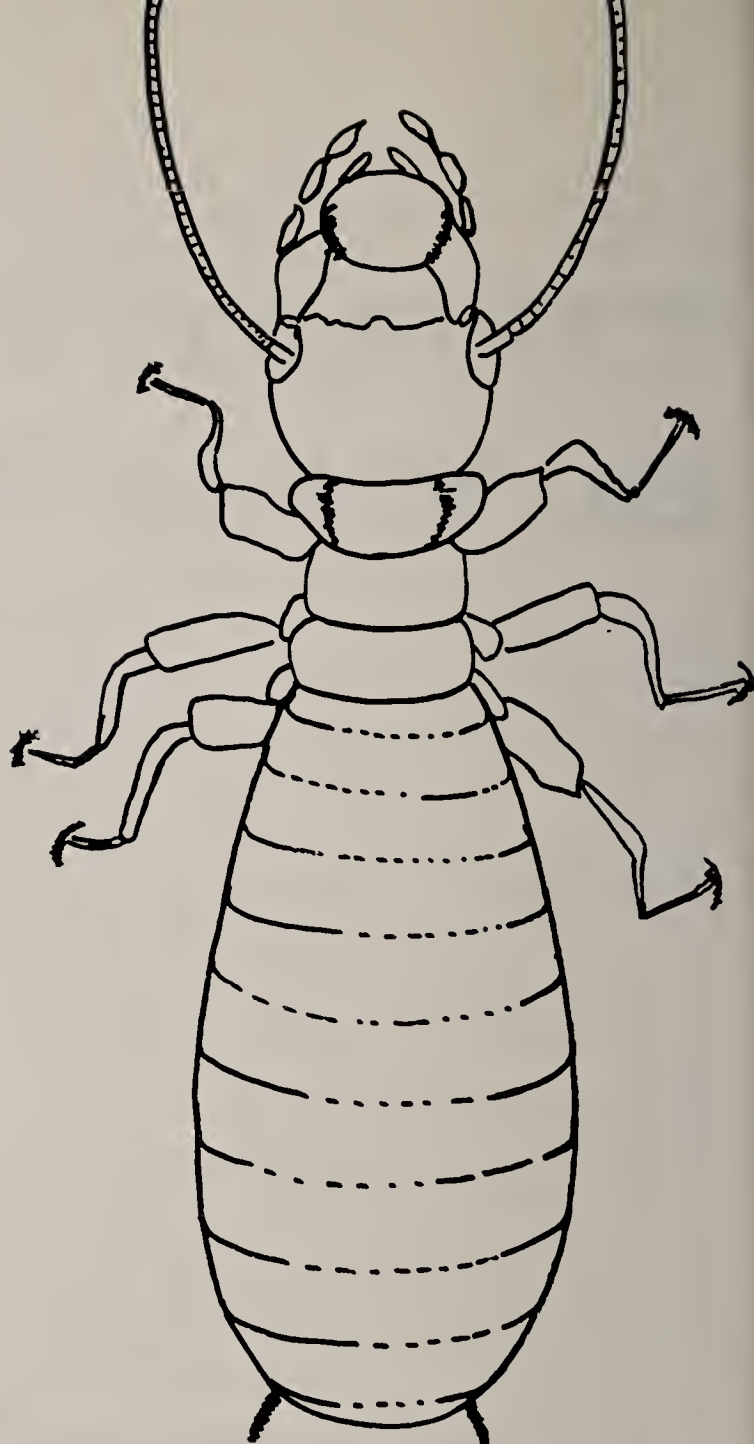


Figure 2

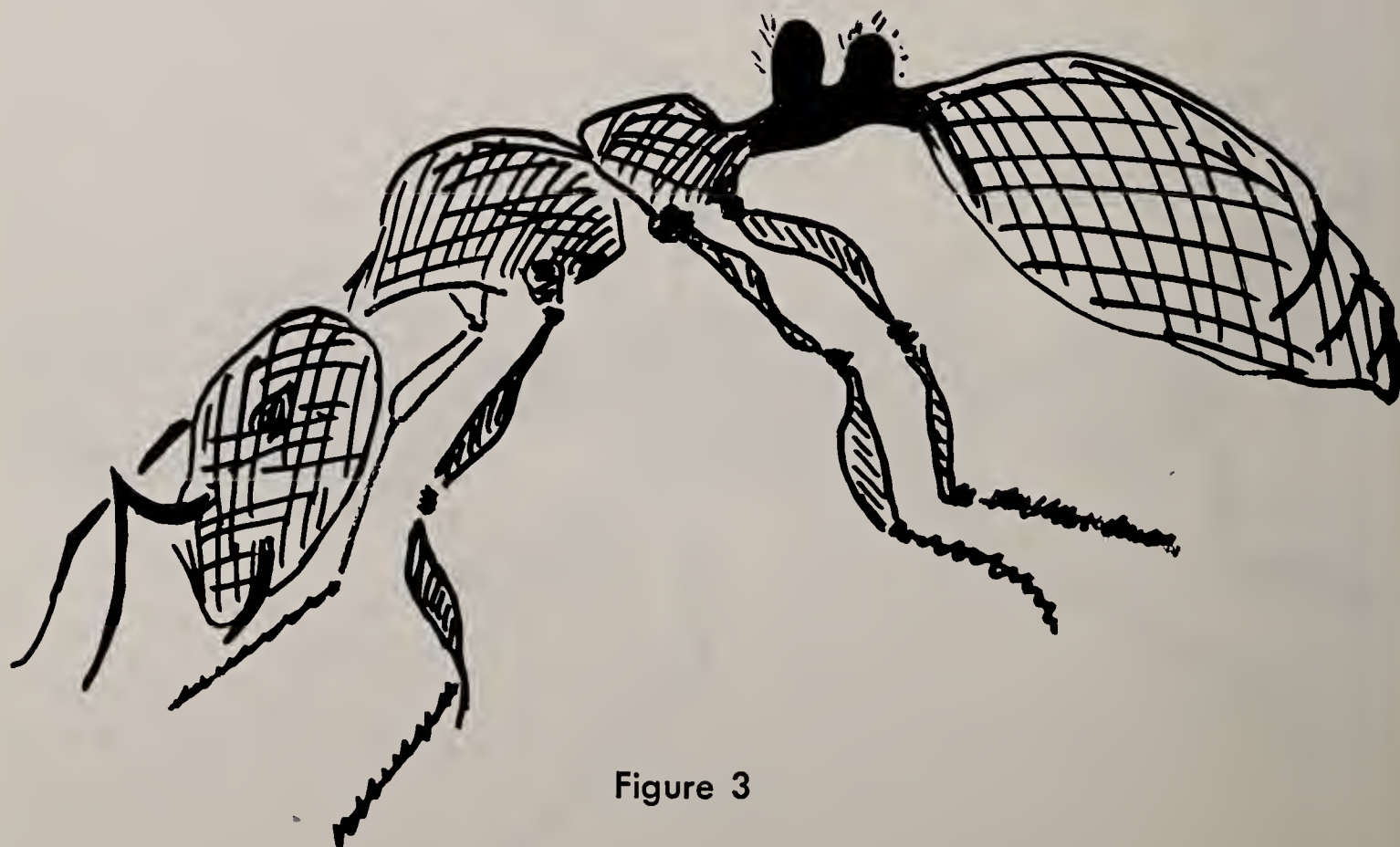


Figure 3

# Exotics of Colorado **YELLOWWOOD**

HELEN MARSH ZEINER

**A**BOUT THE first week in June a small tree just south of Mary Reed Library on the University of Denver campus bursts into a white cloud of fragrant bloom. "What's that little tree down by the library?" is a common question, for this is an exotic not often seen in Denver.

Known by the common name of yellowwood or American yellowwood, this tree is a member of the family Leguminosae, the pea family. It is a relative of honey locust, black locust and redbud trees, as well as numerous well-known herbaceous plants such as the common garden pea.

The name yellowwood is given to this tree because of its yellow heartwood, from which a yellow dye may be obtained.

The botanical name is *Cladrastis lutea*. *Cladrastis* means "brittle twigs". This is a fault of the tree for this area, for the twigs may break in hard wind storms.

Yellowwood is native to a limited area in the southeastern United States but has been widely planted as an ornamental in the eastern United States and in Europe. It is recommended for other areas in the United States and should be hardy in the non-mountainous parts of Colorado.

The trees when mature may attain

heights of 50 to 60 feet but 30 to 45 feet is common. Yellowwood is a graceful tree with a short trunk and a broad, rounded head. The bark is smooth and grayish.

The tree has compound leaves about 8 to 12 inches long. Each leaf is usually composed of 7 to 9 leaflets, each about 3 to 4 inches long and 1½ to 2 inches wide, coming rather abruptly to a tip. They are bright green, turning yellow in the autumn.

Flowers appear in Denver as early as the first week in June, depending on the season. They are fragrant, white, pea-like flowers in large loose clusters 10 to 16 inches long. They are especially showy since they appear after the tree is in leaf making a green background to set off the sprays.

In late summer or early fall the small bean-like pods, from 2 to 4 inches long, ripen. They soon drop, a feature which some people find objectionable.

It is interesting to note that three other species of *Cladrastis* are known in China and Japan.

In spite of its faults, this tree seems to have possibilities for this area. It is rather slow to become established and needs protection during this period. If planted in a sheltered location where it can be irrigated, yellowwood should be successful. It is certainly worth trying.

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***We Need YOU!***

Up to this time the Denver Botanic Gardens has operated with only a limited number of volunteers to assist the six staff members and three maintenance men. With the opening of the conservatory and operating greenhouses scheduled for next year, it has become obvious that a large organization is needed to cope with the increasing activities.

Therefore, a **new volunteer organization — Associates of Denver Botanic Gardens — is being formed.** Membership will be open to any man or woman who is interested in the Gardens and wishes to help. Dependable workers are needed for the following activities: 1) to groom the plantings in the Gardens, 2) to guide tours through the various units of the Gardens, 3) to act as hostesses in the House, 4) to assist in the Library, Herbarium, and proposed gift shop, 5) to help with educational programs, 6) to help with stenographic and clerical work, labeling, mapping, and flower arrangements. More information can be obtained at Botanic Gardens House — or you can phone for registration or fill out the membership blank on the following page. Manager of the Associates is Mrs. Chard Smith, Jr. (756-1327), Assistant Manager is Mrs. Graham Morrison (424-0706).

ASSOCIATES OF DENVER BOTANIC GARDENS  
MEMBERSHIP FORM

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Address \_\_\_\_\_

Telephone \_\_\_\_\_ Date \_\_\_\_\_

Member Denver Botanic Gardens? \_\_\_\_\_

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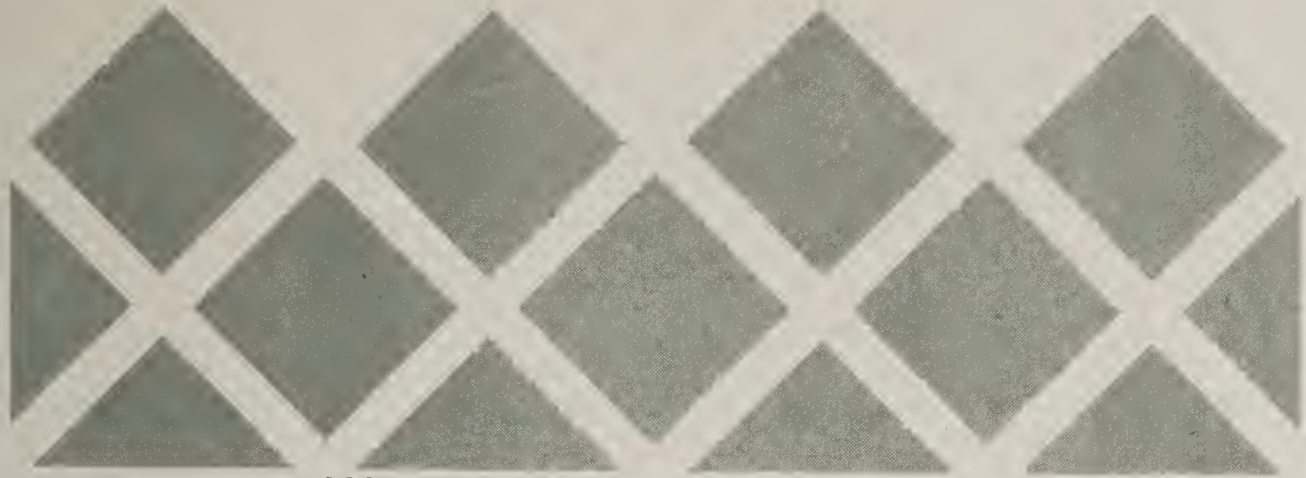
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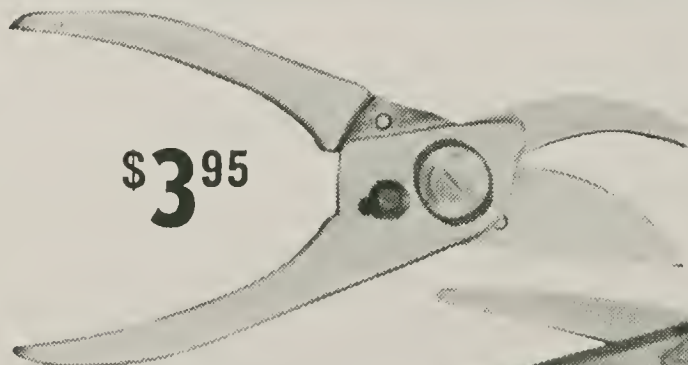
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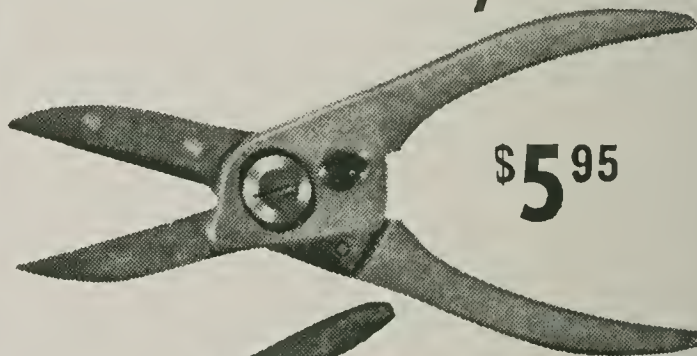
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JULY - AUGUST

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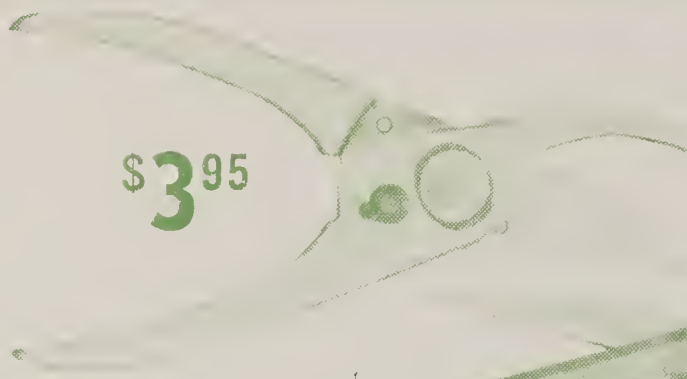
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JULY - AUGUST

Vol. 22

No. 4



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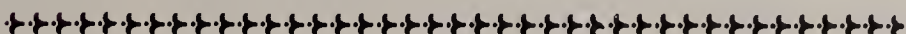
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## THE COVER

*Betula pendula*, EUROPEAN WHITE BIRCH.

Photograph courtesy of Mrs. William H. Crisp.



# A TRIP TO THE ALPINE TUNDRA

MARJORIE L. SHEPHERD

IS THE WEATHER hot as you read this? Would you like to go to the Alpine tundra? Impossible, you say? Not at all! Let us meet next Saturday morning at 8:00 a.m. for the trip.

Since we are going to a colder climate, you will need warm clothes including rain protection, stout shoes, lunch, camera and binoculars, if you have them. Then, since we will be in a land of open space, you will need sun protection, especially sun glasses.

Driving west from Denver on Route 40, we will turn off near El Rancho and follow Route 103. Going on past the Bergen Park area, there will be fields lovely with color. Near the road, there may be a mass of plants making a bright spot of greenish yellow. This will be Rocky Mountain spurge (*Euphorbia robusta*) and, although it is rather weedy in habit, it is pleasing to see so many plants together. After enjoying vistas along the way, we will be over Squaw Pass and nearing Echo

Lake. On the banks on either side of the road, may be showy plants with blooms of bright blue. These are Alpine penstemon (*Penstemon alpinus*) and especially nice since they grow on the banks soon after road construction.

A stop at Echo Lake will make a break in the trip and there are some things we should observe here. First of all, we have come up to an altitude of 10,500 ft. from the 5,280 ft. at Denver. Thus, we have not only travelled west but also north in climate the equivalent of about 1,650 miles. Since the temperature drops in climbing about 3 degrees Fahrenheit per 1,000 feet, it should be about 15 degrees cooler.

Several growing things are worthy of a look as we stretch our legs. First, we look below the wall of the portico of the lodge and there in a damp, protected spot will be a row of musk-root (*Adoxa moschatellina*). This inconspicuous little plant is interesting in

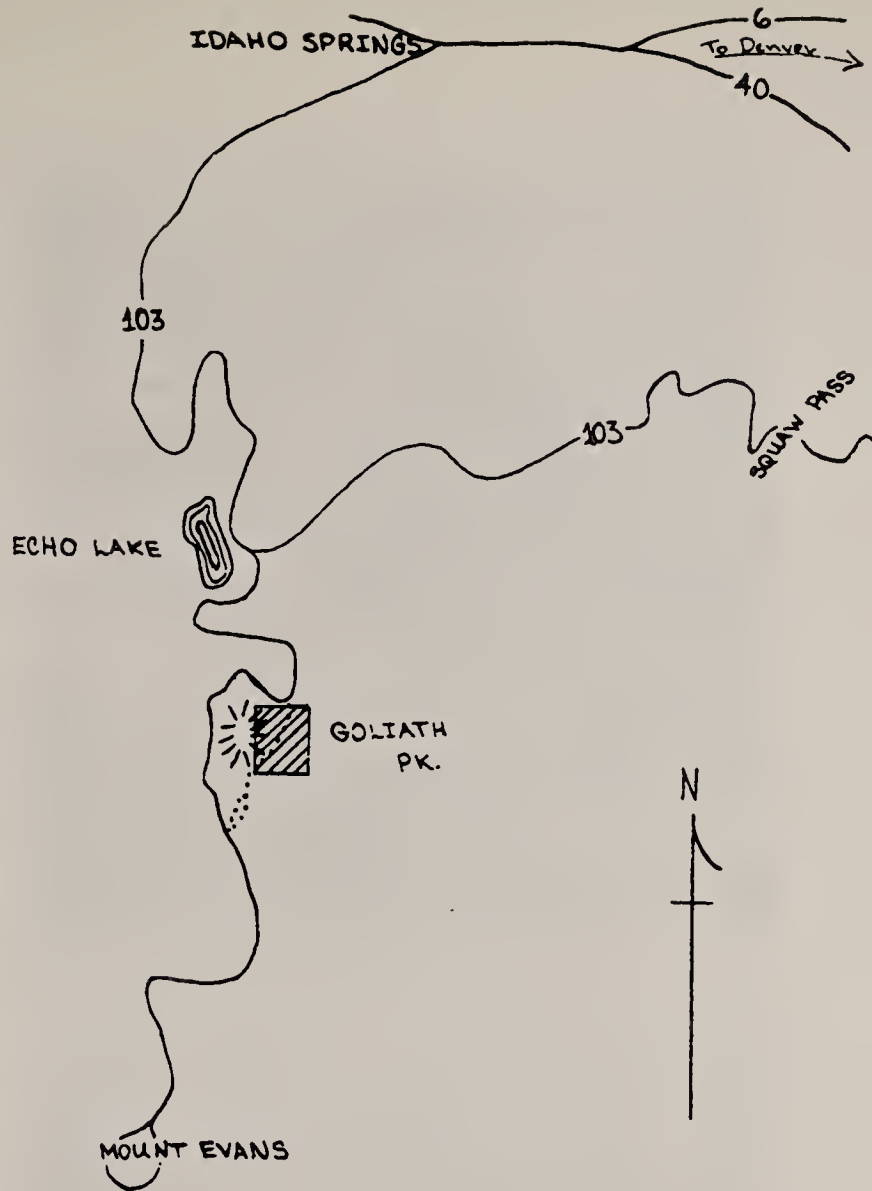
that, although it may look like a member of the buttercup or carrot family, it is an orphan and is the only representative of the Adoxaceae (adoxaceae family). Near the same location, we will find tall chiming bells (*Mertensia ciliata*) and shrubby cinquefoil (*Potentilla fruticosa*). Take a good look at these for we will want to remember how tall they are.

After enjoying a last look at Echo Lake and the mountain peaks beyond, we will start up the winding road which ends on top of Mt. Evans. Look at the mileage and when you have gone 3 miles there will be a parking area. A U.S. Forest Service sign, indicating that picking flowers or removing wood is forbidden, shows that we are now in a preserve. In gaining altitude, we have again travelled north about another 300 miles. We are now in the Hudsonian or Sub-Alpine Zone.

If there is more than one car in our party, we can leave one behind and finish the trip in the remaining transportation. There will be two more miles of winding road and again we travel up and north another 150 miles. Along the way you may look at the lake below and realize how much altitude has been gained. On the road-sides there may be clumps of fuzzy-looking white thistles (*Cirsium hookerianum*) and very decorative they are.

Again, a parking lot and signs; this is the destination for the cars. We are now above timberline and there is only tundra with its carpet of flowers and the rugged boulders that make up the top of Mt. Goliath. This is the Alpine Zone.

While everyone is testing the chill of the air and deciding what we will wear and take with us to be comfortable, let us think for a few moments about the people who have worked to save this bit of high altitude country



for our pleasure. First of all, let us mention the late Fred S. Johnson, a worker with Colorado Forestry and Horticulture Association and later with Denver Botanic Gardens. He had been with the U.S. Forest Service for many years and it was he who conceived the idea for a trail being established on this land which had been set aside by the Forest Service mainly to protect the fine "ghost" trees from vandals. We shall see these trees as we go down the trail. When Mr. Robert L. Woerner was director of Denver Botanic Gardens, he helped lay out the trails and the Forest Service and Denver Botanic Gardens built them. This is now known officially as the M. Walter Pesman Trail.

A number of members of the Botany Club made a trip on June 21, 1958, with Mr. Woerner as leader. This was probably the first organized trip over the trail. It had been raining when we left Denver that morning. We came out into sunshine near Echo Lake and were privileged to look toward the plains from Mt. Goliath and



Rugged boulders that make up the top of Mt. Goliath

see the tops of clouds. This trip was followed by another on June 28th with the Colorado Mountain Club. There were 47 persons in the combined group. Among those present were Mrs. Ruth Ashton Nelson, Dr. E. H. Brunquist and Mr. Robert L. Woerner. This time we used the first printed list of plants of the Mt. Goliath area, which has been revised several times by Dr. Brunquist.

During the years since that first trip, many people have worked with enthusiasm on various phases of making this a worthwhile project — publicity, marking plants before trips, guiding tours, collecting and mounting specimens for the Kathryn Kalmbach Herbarium, publishing lists and writing articles, to name a few.

Now that we have thought about the history of the spot and stopped to reminisce, let us come back to the present and find out what we will see here. Since this is a year with seasons a little behind schedule, it is possible that we may be able to see two very special flowers which we do not find many places. First of all, we will look for Wheeler wallflower (*Erysimum wheeleri*), not a tall variety but with

blossoms in shades of rose to almost purple. These can usually be found near the upper parking area. If we go to the left a short distance, the air may be sweet with perfume. This is the clue to a small plant with cream colored flowers having a yellow eye which turns pink with age. It is rock jasmine (*Androsace carinata*). The plants are so diminutive that you will need to look closely to get a good view of their perfection, especially their rosette of leaves at the base of the plant.

Next before we start down the trail, we will examine some of the plants which huddle close to the ground in mats. We should be able to find: moss campion (*Silene acaulis*), dwarf clover (*Trifolium nanum*), Alpine clover (*Trifolium dasyphyllum*), Alpine sandwort (*Arenaria obtusiloba*), nailwort (*Paronychia pulvinata*), Alpine phlox (*Phlox caespitosa*). These plants grow among the rocks and have roots far into the ground. They may be several hundreds of years old. This area in which they grow is not usually snow covered and they must withstand extremes of temperature and winds.

We will examine one plant more closely than the others, the moss cam-

pion. The needle-like leaves give this mat plant the look of moss and its flowers are rose in color. This plant grows in fellfields (rock fields) throughout the Northern Hemisphere, so in looking at this plant you are indeed looking at something which you would see in Arctic North America, Sweden, or to go south and high, in the Alps of Switzerland. Not far away from where we have looked at the mat plants, we will look for an area where yellow and white seem to be prominent and the plants taller. These will be Alpine avens (*Geum rossii*) and American bistort (*Polygonum bistortoides*) and are plants of the Alpine meadows. Along with these will be Rydbergia (*Hymenoxys grandiflora*), Alp lily (*Lloydia serotina*), yellow paintbrush (*Castilleja occidentalis*) to point out a few.

Among the grasses and sedges of this type of meadow land, we will be apt to find Alpine forget-me-not (*Eritrichium aretoides*). Flowers of an indescribable blue almost cover the small woolly plant on which they grow and, as if this were not enough, they have a delicate fragrance which is worth kneeling down to sniff.

By this time, we have made a start on the trail which leads down. Let us walk along and just enjoy the beauty around us until we find the turn in the trail to the left which will take us to the top of the ridge. (This trail can be used for a circle trip which will return to the upper parking area). When we are on top, we will look between the boulders for a larger and perfectly arranged rosette of thick leaves with an edging of flowers of pink or white. This is big-rooted spring beauty (*Claytonia megarhiza*) and its root may be as much as 6 feet long.

Turning back to return to the main trail, we will take time to peer under

the edges of boulders. This is the hiding place for small treasures that need protection. One plant is the delicate nodding saxifrage (*Saxifrage cernua*) and we might again see the musk-root which we saw at Echo Lake.



*Polygonum bistortoides*

As we walk slowly down the trail, we begin to look at the wonderful coloring of the groups of flowers tucked in between large rocks. Here are rock gardens far more lovely than anything made with human hands. Some groups may be dominated with the blue of chiming bells, not tall as the species at Echo Lake and of a much deeper shade of blue. Another group may be arranged around a fuzzy white thistle. A niche may be filled with alumroot or Alpine mountain sorrel. Here and there are small ferns to add a decorator touch. To me these rock garden arrangements are one of the finest features of the preserve.

On the lower side of the trail, we will find golden buckwheat (*Eriogonum flavum*). This is a woody perennial with rather gray foliage and yellow flowers. It is one of the fine individual displays of Mt. Goliath.

The shrubby cinquefoil (*Potentilla fruticosa*) may not be in bloom yet but we will see how it has adapted to the growing conditions here. Instead of a shrub as we saw it below, it spreads into a flat shape and when in bloom is a glow of gold.

Only a few of the plants have been mentioned but since this was a trip not so much to identify flowers as to look for beauty, we will leave it to you to seek out the names of other plants which may interest you. As we continue on the trail, we can see that we are losing altitude and ahead are the "ghosts" we promised and a fine forest of bristlecone pine (*Pinus aristata*).

This will be a good place to stop for lunch and the "shutter-bugs" can have their special treat for the day. The trees are worn smooth with wind and weather and have interesting texture and color as well as weird shapes.

After lunch, the trip through the forest is restful after the sunshine of the high area. The living pines are beautiful and it is believed that "the oldest living trees of the world belong to this species."

Farther on there are also stately



A natural "rock garden" occurring between large boulders on Mt. Goliath.

Englemann spruce (*Picea englemanni*). There are flowers here, too, and they like the shade which we are enjoying. We will not dwell on these since we went to the Alpine tundra and this area is not included.

Soon we are near the lower parking space and see a few of the mat plants that are still happy at this lower altitude as a remembrance of what we saw this morning.

There is one more rock garden area which you should see. The hillside on the other side of the switch-back may be in bloom. Here the dominant flower is Indian paint brush (*Castilleja spp.*) not orange as we see it on the plains,

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nor yellow as we saw it above but a beautiful clear red and almost covering the ground in spots.

Did you enjoy the day? Can you close your eyes and again see the rock gardens? Will you look at Mt. Evans next winter when plumes of snow are blowing up there and think about the plants you saw today?

### For Further Information

Mt. Goliath Alpine Garden Trail Area, Partial List of the Flowering Plants — 1962 Edition prepared by Dr. E. H. Brunquist, Denver Museum of Natural History.

The Alpine Garden — High Country Outpost of the Denver Botanic Gardens, Dr. E. H. Brunquist, *The Green Thumb*, Oct.-Nov. 1962, Page 319.

Gardeners and the Alpine Trail, Dr. E. H. Brunquist, *The Green Thumb*, June-July, 1963, Page 166.

The Alpine-Subalpine Trails of Mt. Goliath, Dr. E. H. Brunquist, *The Green Thumb*, June-July 1964, Page 163.

*Alpine Wildflowers of Rocky Moun-*

*tain National Park* (Colored illustrations) Bettie E. Willard & Chester O. Harris, Rocky Mountain Nature Association, Estes Park, Colorado.

### SOME USEFUL BOOKS

*Handbook of Plants of the Colorado Front Range*, William A. Weber, University of Colorado Press, Boulder.

*Plants of the Rocky Mountain National Park*, Ruth Ashton Nelson, Government Printing Office, Washington, D.C.

*Meet the Natives*, M. Walter Pesman, Denver Museum of Natural History.

*Manual of the Plants of Colorado*, H. D. Harrington, Colorado State University, Sage Books, Denver, Colo.

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### ERRATA

The following errors were made in the March-April issue of *The Green Thumb*: Page 39, "Contents", Line 1; appeared Walter Poppum, should have been Walter D. Popham; Page 40, author's name appeared Walter Poppum, should have been Walter D. Popham; Page 59, Column 1, Line 15, appeared Edward D. Leonard, should have been Edward D. Bennett.

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# FIGS . . .

## A Challenge To An Adventurous Gardener

RUTH ASHTON NELSON

SOME GARDENERS like to try the impossible and now and then one discovers that such an adventure proves the so-called "impossible" to be possible under certain conditions. In at least one Colorado Springs garden that I know of there is a redbud which has bloomed for several years. Occasionally I hear of rhododendrons which are surviving Rocky Mountain winters; dogwood and redbud trees bloom in Boulder gardens; larches and yews have been grown successfully in Wyoming and Colorado. Doubtless, other examples could be cited by readers of this article. The secret of growing these tender plants in a climate to which they are not naturally suited is to make a micro-climate for them. In some cases this isn't worth doing, in other cases it is fun to try. So, I tried to grow figs. My adventure was only partially successful but I think that under a different set of circumstances it might be more fruitful. An adventurous gardener who has a liking for that luscious fruit ripe off the branch may be tempted to try.

The fruit fig, varieties of *Ficus carica*, is a very interesting plant and in Colorado it can be grown as a perennial or a tender shrub. It provides lush foliage and the individual leaves

are of beautiful design. Fruit is born on the new growth and this is one reason that gardeners in cold climates have a chance of success with it. The problem of growing it to fruition is in being able to provide a long enough frost free season for the fruit to set and mature. I never achieved ripe fruit but I believe this would be possible in Colorado at altitudes below six thousand feet, if it were planted in an ideal situation. By "ideal situation" I mean one well protected from wind and exposed to full sun, especially in late summer. An angle facing south between stone or brick walls is desirable. This could be a corner of a patio if it received the full sun all summer and early fall. The brick or stone of the walls will absorb heat during the day and so temper the surrounding air at night. In this way they give some protection from the frosts and light freezes to which our mountain climate is subject in spring and fall.

I had two fig "bushes" in Colorado Springs which thrived for five summers; that was until I moved away. After frost had killed the leaves but before a hard freeze I laid down about four canes of each bush, fastening them to the ground with heavy wire pins. These and the crowns were then mounded

over with soil and covered with leaves. They should have an occasional watering during the winter. In the spring when danger of hard freezes was past I uncovered them and watered them well. These canes soon broke into leaf and new sprouts appeared. By early summer small figs had set on. By fall the bushes would be four to five feet tall. But as the position of the sun became lower after the middle of summer its heat was cut off by neighboring trees and buildings and was not sufficient to ripen the fruit. But even if the fruit never ripens figs are worth growing for their beautiful foliage.

A fig is not a single fruit in the botanical sense, but a collection of tiny individual fruits which grow on the inside of a fleshy receptacle. This whole structure becomes the juicy, edible fig. Some varieties of fig require pollination by a certain species of wasp in order that the fruit may develop. This is true of the black mission fig grown commercially in California. However, there are varieties which do not depend on such pollination. Varieties of this type are grown in Texas, southern Arkansas and Oklahoma. If one wished to try them in our area, plants of the latter type should be obtained. Two varieties of this type are Brown Turkey and Everbearing. They can be obtained from nurseries in the Ozarks or in northern Texas.



Fig bushes about 5 feet tall with immature figs, late summer, in the author's garden at Colorado Springs.



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*Monstera deliciosa* (Çeriman)

## Plant Trails in Denver Botanic Gardens Boettcher Conservatory

ERNEST BIBEE

PLANS ARE being made to add several hundreds of different kinds of tropical and sub-tropical plants to our interesting collection of temperate zone plants at Denver Botanic Gardens. These plants will be planted in the new and uniquely designed Boettcher Conservatory upon its completion. Many of the plants are already on hand, many more are on order and will be delivered soon for the initial planting. During the ensuing months this number will be increased to give a good representation of the immeasurably rich tropical and sub-tropical flora of all parts of the world.

During a short visit to the Conservatory it will be impossible to get a complete education in tropical botany but it will afford opportunity for the public to enjoy and to study tropical plants the

year around. Explanations by trained personnel and short descriptions by several educational media, of some of the more interesting plants may increase the interest in what can be seen during a tour of the Conservatory.

In reality, a tropical jungle is not very colorful as a whole. All shades of green with their various textures occur in diversified forms, with occasionally a brilliantly colored flower. These are usually so high up in the canopy of the forest that only the birds and monkeys see them. However, occasional displays of vivid color in unusual forms will be encountered, that are not often found in temperate zone floras.

In the Conservatory we will endeavor to bring as much of this color into the replicas of the tropical vegetation as scientific accuracy allows. We will es-

pecially feature plants with variegated and colorful leaves such as Crotons, *Acalypha* spp., *Aphelandra* spp., *Dracaena* spp., *Dieffenbachia* spp., Bromeliads, *Abutilon* spp., *Coleus* spp., *Sanchezia*, *Caladium* and other aroids.

Only a few genera flower continuously, such as the *Abutilon* spp., *Lantana* spp. and the colorful *Hibiscus* in its many varieties.

The Conservatory will be divided into several irregular islands or planting areas. These will be interspersed by paths or trails leading the viewer among the various replicas of tropical vegetation. Scientific and common names will be attached to the plants along with their family name, so that you may readily associate them with members of the temperate zone plants with which you are acquainted.

Various collections of container-grown plants from our greenhouses will be displayed, while they are flowering, in areas provided for this purpose. Additional plant specimens, oddities and educational exhibits will be displayed from time to time to give the amateur botanists, horticulturists and plant lovers a broader scope of the plant world.

Epiphytes of various kinds will be

displayed on host plants. They will be growing under simulated natural conditions, with some, perhaps, growing on artificial trees or other supports that will have been placed in those areas of the Conservatory where the conditions most closely resemble that of their native habitat.

The variety of edible fruits, spectacular flowers, plants that have medicinal or other economic use and the number of plants of special interest that grow in the tropics is great. Many of these tropical and sub-tropical fruits, economic plants and plants of special interest will be displayed in our Conservatory. We at Denver Botanic Gardens are putting forth our efforts that many of these plants may soon be available to the residents of Denver, the surrounding areas and to all who may come our way.

Contrary to common belief, a tropical jungle is not very colorful, but many of the most vividly colored and unusual flower forms are to be found in the flora of the tropical areas. Some of the outstanding families and the genera within them that do most to brighten and add interest to our jungles and conservatories are listed below:

Leguminosae — *Acacia*, *Cassia*,

*Passiflora quadrangularis* (Giant Granadilla)



*Calliandra*, *Bauhinia*, *Delonix*, *Erythrina* and *Peltophorum*.

Economically the Leguminosae or pea family is one of the most important families of flowering plants. This family provides many articles of food, fodder, dyes, gums, resins, oils and in addition to this, members of over 140 genera are grown domestically for ornament.

Bignoniaceae — *Jacaranda*, *Kigelia*, *Pyrostegia*, *Spathodea*, *Stenolobium*, *Tabebuia*, *Tecomaria*, *Bignonia*, *Doxantha* and *Pandorea*.

Economically the Bignoniaceae or bignonia family, which includes *Campsis* and *Catalpa* in the temperate zone, also includes members used for lumber, fence-post material and many cultivated ornamentals.

Bombacaceae — *Bombax*, *Chorisia* and *Pachira*.

Economically the Bombacaceae or bombax family is important as the source of kapok and balsa wood. Species of a few genera are cultivated for ornament.

Malvaceae — *Hibiscus*, *Abutilon* and *Malvaviscus*.

Economically the Malvaceae or mallow family is of greatest importance for the cotton of commerce. Notable among the 30 genera whose species are grown for ornament are the hollyhocks (*Althaea*) of the temperate zone.

Apocynaceae — *Nerium*, *Acokanthera*, *Beaumontia*, *Mandevilla* (*Dipladenia*), *Strophanthus*, *Thevetia*, *Allamanda*, *Ervantamia*, *Plumeria*, *Trachelospermum*, *Carissa* and *Ochrosia*.

*Musa sapientum* (Banana)



Economically the Apocynaceae or dogbane family is of importance domestically for its ornamentals. *Amsonia* and *Vinca* are genera in this family that are hardy in the north. Many members of the family are poisonous when vegetative parts and fruits are eaten. *Carissa* (natalplum) produces edible fruits and *Strophanthus* produces an alkaloid useful medicinally.

Verbenaceae — *Lantana*, *Clerodendrum*, *Vitex*, *Holmskioldia*, *Duranta*, *Congea*, *Tectona* and *Petrea*.

Economically the Verbenaceae or verbena family is perhaps most important for teakwood lumber (*Tectona grandis*) of East India. A number of genera contain important ornamentals; notable among them are *Verbena* and *Callicarpa* used much in the temperate regions. Several of the tropical and sub-tropical genera listed above contribute important species that are used as ornamentals.

Rubiaceae—*Gardenia*, *Pentas*, *Coffea*, *Bouvardia*, *Coprosma*, *Serissa*, *Cinchona*, *Ixora*, *Mussaenda* and *Psychotria*.

The Rubiaceae or madder family is of economic importance primarily for several tropical crops, notably coffee, quinine and ipecac. In addition to these a number of ornamentals are grown from the genera listed.

Rutaceae — *Citrus*, *Triphasia*, *Murraya*, *Fortunella*, *Severinia* and *Calodendrum*.

The Rutaceae or rue family contains many members of economic importance. Notable among them are the citrus fruits: orange, grapefruit, lemon, lime, tangerine, citron (all from *Citrus*) and kumquat (*Fortunella*). Temperate zone ornamentals include the common rue (*Ruta*), dittany or gasplant (*Dictamnus*) and the Amur-river cork tree (*Phellodendron*).

Amaryllidaceae — *Crinum*, *Euchar-*

*is*, *Clivia*, *Hymenocallis*, *Haemanthus*, *Zephyranthes*, *Agave* and *Furcraea*.

Economically the Amaryllidaceae or amaryllis family contributes a large number of plants that are important to many activities. The agaves are primary sources of fiber used in cordage, particularly of sisal and henequen. Cuban and Mauritian hemp is made from leaves of the related *Furcraea*. In Latin American countries extensive acreages of agave are grown as the source of the sugary exudate used as the basis for the distilled gin-like liquors mezcal and tequila. Pulque is a fermented beverage from the same source. Flour is made in Chile from roots of *Alstroemeria*. The better known ornamentals, grown in the temperate zones, in this family are in the genus *Narcissus*. Also well known is the *Amaryllis*, the showy genus from which the family gets its name.

Myrtaceae — *Eucalyptus*, *Eugenia*, *Feijoa*, *Psidium*, *Syzygium*, *Myrciaria*, *Pimenta*, *Callistemon*, *Melaleuca*, *Myrtus* and *Leptospermum*.

Economically the Myrtaceae or myrtle family is of considerable importance throughout the world but of limited importance in the United States. It is important for the edible fruit of the guava, jaboticaba and Surinam cherry.

Spices such as the clove, allspice, and oil of bay rum are also derived from members of this family. Many of the genera above are cultivated domestically as ornamentals in warmer areas of this country.

Combretaceae — *Combretum*, *Quisqualis*, *Concocarpus*, *Terminalia* and *Bucida*.

The Combretaceae or combretum family is of little domestic economic importance. The tropical or Indian almond (*Terminalia catappa*) is cultivated in warmer parts of the country

Continued on page 129

# CITY PARK

KATHERINE B. CRISP

A GIFT OF LAND to Denver by Mayor E. Bates (1872-1873) was the beginning of City Park. On the land northeast of the present park greenhouse, Mayor Bates planted cottonwood trees in a treeless place that seemed miles away from the city.

In 1883 City Park was extended by land acquired from the state of Colorado. New sections were added from time to time. The original plan was made by Reinhardt Schuetza. According to his plan, trees were planted in circles which were connected by paths. Many of these trees were contributed by citizens and by school children at Arbor Day celebrations. These trees thus became an intimate part of the life of the people. This, a satisfactory plan in the beginning gave rise to a fixed public opinion which opposed strongly any modification to meet up-to-date landscape plans.

In 1918 the driveway from the Museum of Natural History to the lily pond was landscaped at the expense of the Old Croney Club, an organization of pioneer men and women. Forty-two sycamores called Oriental plane trees were planted along both sides of the driveway. A majority of these trees are gone, killed by disease. After almost a half century, 13 trees remain. American lindens are being planted to replace the dying trees.

A map was made in 1932 of a limited space around the Museum, selected because of the many kinds of

trees found there. Twenty-three species were noted, the majority of which could be pointed out from any one location. Along Colorado Boulevard silver poplars and American elms alternated with each other. The silver poplars were growing approximately twice as fast as the American elms. Around the pool west of the Museum were fine hawthorns, two species of birch, a sycamore maple, Ohio buckeyes, a Camperdown elm and Japanese maples. An avenue of horse chestnuts was planted west of the central pool. Of these trees only two remain.

In 1951 an agreement was entered into by the City and County of Denver and the Botanical Gardens Foundation of Denver, Inc. and approximately 100 acres in the eastern end of City Park, surrounding the Denver Museum of Natural History and sloping westward were set aside for botanical purposes.

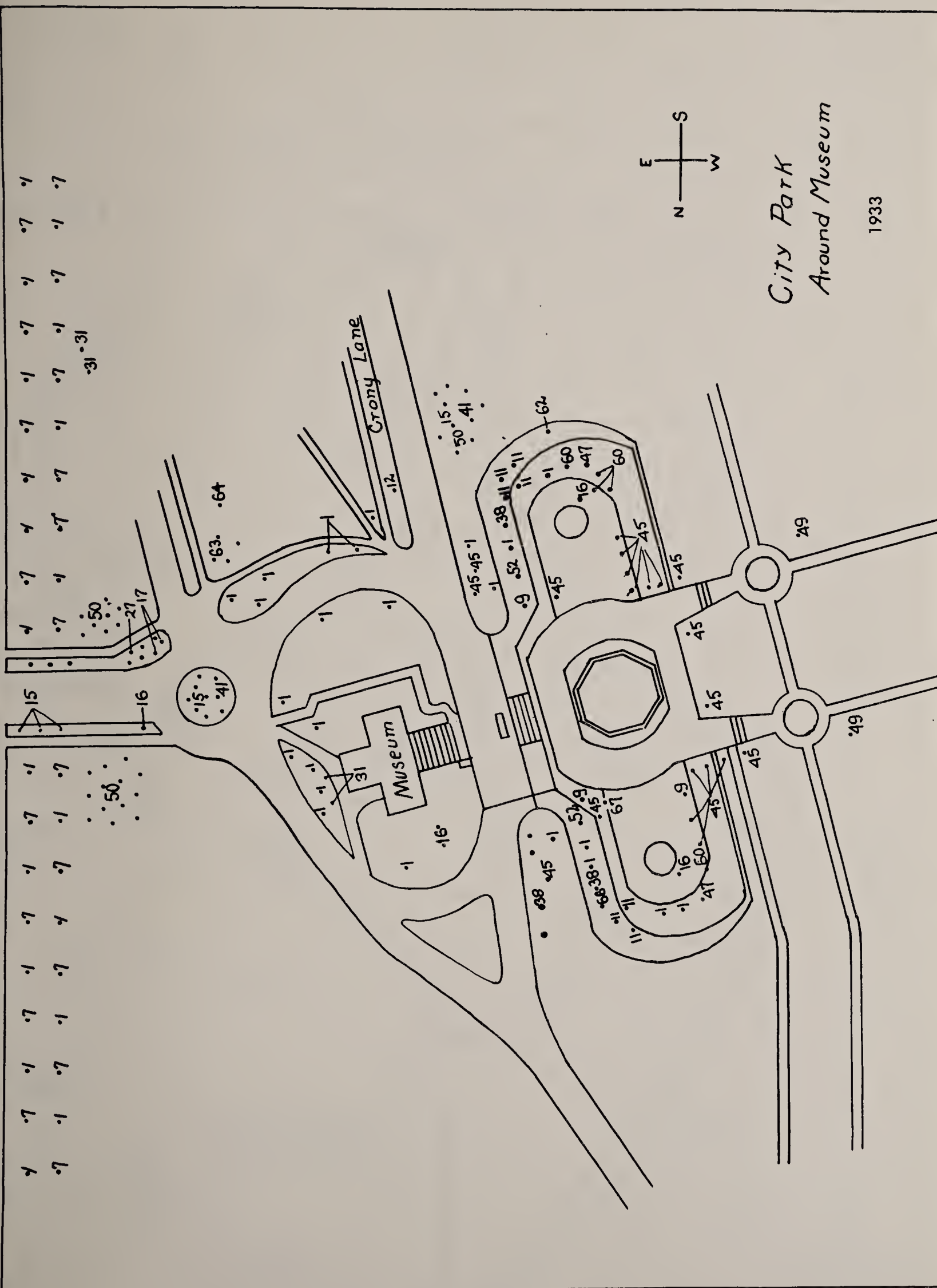
Reinhardt Schuetza who was definitely engaged by the city about 1894, held the office of landscape architect until his death in 1909. In 1910 S. R. DeBoer was appointed to this position and is professionally responsible for the most important advances in the landscaping of our city.

When Colorado Boulevard was widened for a super highway, a wide strip of land on the eastern side of City Park was taken and the many fine elms were destroyed.

The remaining area has been brought up-to-date and given a more modern

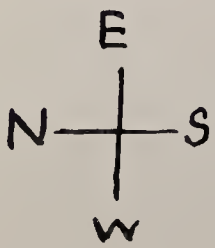
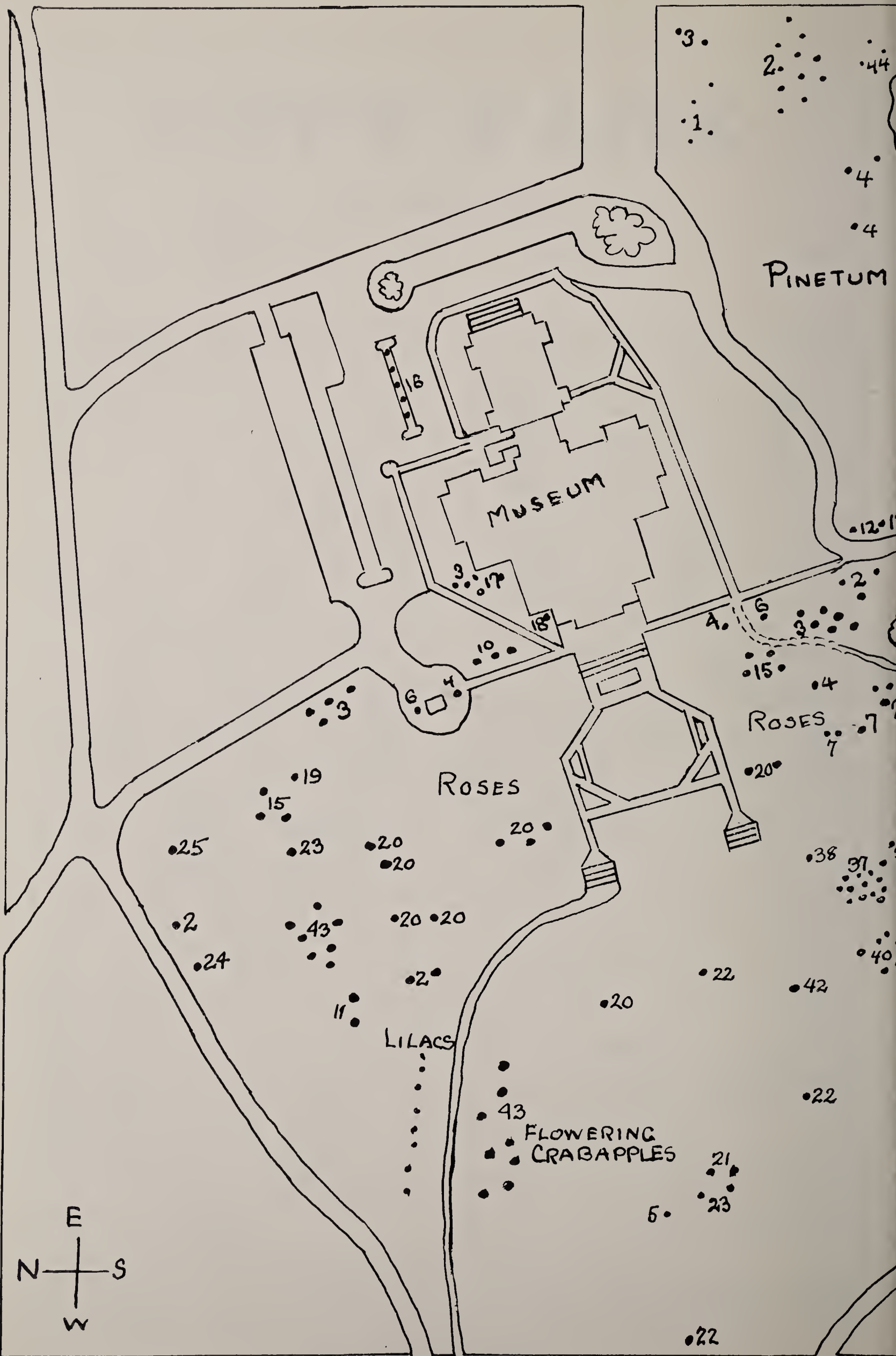
Blvd.

Colorado



*City Park  
Around Museum*

1933





aspect. In the new design, Mr. DeBoer included a Box Canyon with running water. He provided for the Glenmore Pinetum, evergreens donated by Mr. Robert E. More; a lilac lane, lilacs donated by Mr. Milton Keegan; a Rosarium, roses donated through the Denver Rose Society; hardy ferns donated by the Helen Fowler Library Council; hemerocallis donated by Mr. LeMoine Bechtold and the Iris garden by the Denver Iris Society. In addition are groups of trees of the *Prunus* varieties and a crabapple tree collection planned by Mr. DeBoer.

Two historic markers are of interest. In the southeast corner stands a fine English elm, known as the Shakespeare elm, about 50 years old. A scion of a tree from Stratford on Avon, England was planted by John L. Russell, April 23, 1916. In the area west of the Museum near the lake a bronze marker reads: This grove of nut trees was planted in honor of the two hundredth Anniversary of the birth of George Washington by Peace Pipe Chapter of the Daughters of the American Revolution, 1732-1932. Three black walnut trees remain to represent the grove.

### LEGEND — MAP OF CITY PARK AROUND MUSEUM — 1933

- |   |   |
|---|---|
| 1. American elm — <i>Ulmus americana</i>                  | 45. Scarlet-fruited thorn — <i>Crataegus coccinea mollis</i>  |
| 2. Silver poplar — <i>Populus alba</i>                    | 47. Bollis poplar — <i>Populus alba bolleana</i>              |
| 9. Weeping cutleaf birch — <i>Betula pendula gracilis</i> | 49. Horse-chestnut — <i>Aesculus hippocastanum</i>            |
| 11. Ohio buckeye — <i>Aesculus glabra</i>                 | 50. Ponderosa pine — <i>Pinus ponderosa</i>                   |
| 12. Sycamore — <i>Platanus occidentalis</i>               | 52. White birch — <i>Betula pendula</i>                       |
| 15. Colorado blue spruce — <i>Picea parryana</i>          | 60. Japanese maple — <i>Acer ginnala</i>                      |
| 16. White fir — <i>Abies concolor</i>                     | 62. Flowering crabapple — <i>Malus ioensis plena bechteli</i> |
| 17. Rocky Mountain red cedar — <i>Sabina scopulorum</i>   | 63. Japanese pagoda tree — <i>Sophora japonica</i>            |
| 27. Weeping willow — <i>Salix babylonica</i>              | 64. White mulberry — <i>Morus alba</i>                        |
| 31. Russian olive — <i>Elaeagnus angustifolia</i>         | 66. Sycamore maple — <i>Acer pseudoplatanus</i>               |
| 38. English elm — <i>Ulmus campestris</i>                 | 67. Camperdown elm — <i>Ulmus glabra camperdownii</i>         |
| 41. Douglas fir — <i>Pseudotsuga mucronata</i>            |   |

### LEGEND — MAP OF CITY PARK AROUND MUSEUM — 1965

- |  |   |
|--|---|
| 1. Douglas fir — <i>Pseudotsuga taxifolia</i>                        | 23. Black walnut — <i>Juglans nigra</i>                       |
| 2. Austrian pine — <i>Pinus nigra</i>                                | 24. White ash — <i>Fraxinus americana</i>                     |
| 3. Colorado blue spruce — <i>Picea pungens</i>                       | 25. Cockspur thorn — <i>Crataegus crus-galli</i>              |
| 4. American elm — <i>Ulmus americana</i>                             | 26. English oak — <i>Quercus robur</i>                        |
| 5. Russian olive — <i>Elaeagnus angustifolia</i>                     | 27. Tulip tree — <i>Liriodendron tulipifera</i>               |
| 6. English elm — <i>Ulmus procera</i>                                | 28. Hackberry — <i>Celtis occidentalis</i>                    |
| 7. Soft maple — <i>Acer saccharinum</i>                              | 29. Red cedar — <i>Juniperus virginiana</i>                   |
| 8. Japanese pagoda tree — <i>Sophora japonica</i>                    | 30. Arbor vitae — <i>Thuja occidentalis</i>                   |
| 9. Norway maple — <i>Acer platanoides</i>                            | 31. Western catalpa — <i>Catalpa speciosa</i>                 |
| 10. American linden — <i>Tilia americana</i>                         | 32. European alder — <i>Alnus glutinosa</i>                   |
| 11. Scotch pine — <i>Pinus sylvestris</i>                            | 33. Mulberry — <i>Morus alba</i>                              |
| 12. Sycamore — <i>Platanus occidentalis</i>                          | 34. White birch — <i>Betula pendula</i>                       |
| 13. White mulberry — <i>Morus alba pendula</i>                       | 35. Eastern black cherry — <i>Prunus serotina</i>             |
| 14. Littleleaf linden (small-leaved European) — <i>Tilia cordata</i> | 36. Choke cherry — <i>Prunus virginiana demissa</i>           |
| 15. Ohio buckeye — <i>Aesculus glabra</i>                            | 37. Wild plum — <i>Prunus americana</i>                       |
| 16. Bur oak — <i>Quercus macroparpa</i>                              | 38. Sargent cherry — <i>Prunus sargentii</i>                  |
| 17. White fir — <i>Abies concolor</i>                                | 39. Purple leaf plum — <i>Prunus 'Newport'</i>                |
| 18. Pinyon pine — <i>Pinus cembroides edulis</i>                     | 40. Purple leaf plum (sand cherry) — <i>Prunus cistina</i>    |
| 19. Sycamore maple — <i>Acer pseudoplatanus</i>                      | 42. Sour cherry — <i>Prunus cerasus</i>                       |
| 20. Downy hawthorn — <i>Crataegus mollis</i>                         | 43. Flowering crabapples — <i>Malus</i> spp.                  |
| 21. Kentucky coffee tree — <i>Gymnocladus dioicus</i>                | 44. 'Hopa' crab (Siberian crab) — <i>Malus baccata 'Hopa'</i> |
| 22. Horse chestnut — <i>Aesculus hippocastanum</i>                   |   |

Continued from page 123

for ornament and for its edible nuts.

Araceae — *Anthurium*, *Caladium*, *Philodendron*, *Zantedeschia*, *Dieffenbachia*, *Pothos*, *Aglaonema*, *Amorphophallus*, *Alocasia*, *Calocasia*, *Scindapsus*, *Pistia*, *Monstera* and *Spathiphyllum*.

Economically the Araceae or arum family is of little importance in the United States aside from the many members grown as ornamentals. In Old World tropics and sub-tropics the thickened rootstocks of *Calocasia* (taro) are a source of starchy food, while those of *Alocasia* are used similarly to a lesser extent. The large "fruits" of *Monstera* are eaten in many tropical regions and prized for their delicate flavor. Notable among the several genera cultivated for ornamental purposes is the calla of florists (*Zantedeschia*). Several of the above genera whose members provide durable foliage plants are used for interior decoration.

Acanthaceae — *Justicia*, *Beloperone*, *Sanchezia*, *Pseuderanthemum*, *Fittonia*, *Jacobinia*, *Crossandra*, *Ruellia*, *Aphelandra*, *Thunbergia*, *Acanthus* and *Daedalacanthus*.

The Acanthaceae or acanthus family is of little domestic importance. Species of several genera, mostly tropical,

are cultivated as ornamentals. Several of the genera have species with showy, variegated foliage.

Malpighiaceae — *Banisteria*, *Malpighia*, *Stigmaphyllon* and *Thryallis*.

Members of the Malpighiaceae or malpighia family are of little domestic importance. All of the above named genera are cultivated as ornamentals in warm parts of the country. The Barbados cherry (*Malpighia glabra*) is also being utilized in the commercial production of vitamin "C" because of the unusually high ascorbic acid content of its fruit.

Euphorbiaceae — *Euphorbia*, *Acalypha*, *Codiaeum*, *Jatropha*, *Manihot*, *Macaranga*, *Phyllanthus* and *Hevea*.

The Euphorbiaceae or spurge family is of considerable economic importance from the world viewpoint. Products of the family include rubber (*Hevea*), tung oil (*Aleurites*), castor oil (*Ricinus*) and cassava or tapioca (*Manihot*). Many members of the family are grown domestically as ornamentals, notably the poinsettia, crown of thorns and croton.

Sterculiaceae—*Brachychiton*, *Dombeya*, *Sterculia*, *Theobroma* and *Cola*.

Economically the Sterculiaceae or sterculia family is important as a source of cacao or chocolate produced from the fermented seeds (beans) of

*Dombeya wallichii* (Pink Snowballs)





*Passiflora quadrangularis* (Giant Granadilla)

the tropical American tree (*Theobroma cacao*). Species of a few genera are cultivated domestically in warm regions as ornamentals.

Theaceae — *Gordonia*, *Camellia* and *Thea*.

Economically Theaceae or the tea family is most important for the tea plant of commerce (*Camellia sinensis*). Domestically, many genera contribute significant ornamentals of warm climates, notably *Camellia*, *Cleyera* and *Eurya*.

Passifloraceae—*Passiflora*, *Tacsonia* and *Tetrapathaea*.

Economically members of the Passifloraceae or passion flower family are of domestic importance as ornamentals and for the edible fruit of the several species of Granadilla (*Passiflora edulis*, *P. laurifolia*, *P. quadrangularis*, *P. ligularis* and others). More than 20 species of passiflora are cultivated for the ornamental value of the vines and the showy unusual flowers.

Cactaceae — *Pereskia*, *Rhipsalis*,

*Cereus*, *Epiphyllum*, *Zygocactus* and *Schlumbergera*.

The Cactaceae are characterized, in general, by the fleshy habit, the spines or glochids arranged in areoles, the flowers solitary and with an undifferentiated perianth of very numerous segments basally fused to form a hypanthium, the numerous stamens arranged spirally or in clusters and the glochidiate spiny or bristly berry.

Economically the Cactaceae or cactus family is of domestic importance as ornamentals and are cultivated extensively in the open or under glass in all parts of the country. About 130 genera and over 1,200 binomials are listed in the trade literature as cultivated in this country. The fruit of the Indian fig or prickly pear (*Opuntia spp.*) is edible and a product common in Mexican markets.

Punicaceae — *Punica*.

The Punicaceae or pomegranate family is a unigeneric family of only 2 species. The pomegranate is cultivated

in warm parts of this country for its edible fruits and as a decorative ornamental.

Melastomaceae — *Tibouchina*.

The Melastomaceae or melastoma family is distinctive and readily identified by the leaf venation and the stamen morphology.

Economically the family is of little domestic importance. A few species are cultivated for ornament. In parts of Brazil, where the species are abundant, the family forms a characteristic component of the vegetation.

Araliaceae — *Brassia*, *Aralia*, *Polyscias*, *Dizygotheca*, *Tetrapanax* and *Fatsia*.

Economically the Aralicaeae or ginseng family is of little domestic importance. Many variants of English ivy (*Hedera helix*) are cultivated as evergreen vines. Species of a number of genera are grown as ornamental shrubs or small trees. The pith of the rice-paper plant (*Tetrapanax papyrifera*) is the source of Chinese rice paper and the plant is grown here in the warmer parts of the country as a novelty. Ginseng roots, used in medicinal preparations, are obtained from *Panax quinquefolius*.

Plumbaginaceae — *Plumbago*.

Economically the Plumbaginaceae or leadwort family is of little importance. A number of species of thrift (*Armenia*), statice (*Limonium*) and one or more species of leadwort (*Cerastigma*), plumbago (*Plumbago*) and prickly thrift (*Acantholimon*) are cultivated for ornament.

Oleaceae — *Jasminum*, *Olea* and *Osmanthus*.

The Oleaceae or olive family is of considerable economic importance. The olive (*Olea*) a source of food and oil expressed from the fruit is of high value. Ash lumber (*Fraxinus*) is of high value in cabinet work. Most of the other genera contribute important ornamentals, notably the lilac (*Syringa*), privet (*Ligustrum*), jasmine (*Jasminum*), golden bells (*Forsythia*), fringe tree (*Chionanthus*), fragrant olive (*Osmanthus*) and *Phillyrea*.

Proteaceae—*Grevillea*, *Macadamia*, *Banksia*, *Leucadendron*, *Telopea* and *Stenocarpus*.

The Proteaceae or protea family is important domestically for its ornamentals and about 20 genera and 100 species are offered in the American trade. They are cultivated primarily in California. The Queensland nut (*Macadamia*) is popular in Hawaii for its fruit, an edible delicacy and the species is grown to a small extent in southern California.

Asclepiadaceae — *Asclepias*, *Hoya*, *Stapelia*, *Cryptostegia* and *Stephanotis*.

Economically the Asclepiadaceae or milkweed family is important domestically for the “down” of low quality obtained from the seed and for a few genera grown as ornamentals. These include the butterfly weed (*Asclepias tuberosa*), bloodflower (*A. currassavica*) and blue milkweed (*Oxypetalum caeruleum*).

Boraginaceae — *Cordia* and *Heliotropium*.

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The Boraginaceae or borage family is of slight economic importance. A number of species of about 30 genera are cultivated to a limited extent for ornament. *Heliotropium* and *Cordia* are notable tropical genera. Temperate zone genera and those used as garden annuals are Virginia bluebells (*Mertensia*), forget-me-nots (*Myosotis*), lungwort (*Pulmonaria*), borage (*Borago*), alkanet (*Anchusa*) honeywort (*Cerinth*), hound's tongue (*Cynoglossum*), comfrey (*Symphytum*) and vipers bugloss (*Echium*).

Labiatae — *Salvia*, *Coleus*, *Rosmarinus*, *Mentha* and *Teucrium*.

Economically the Labiatae or mint family is of importance as a source of volatile aromatic essential oils and garden ornamentals. Some of the more important essential oils are sage (*Salvia*), lavender (*Lavandula*), rosemary (*Rosemarinus*), mint (*Mentha*) and patchouly (*Pogostemon*). Others serve as important culinary herbs prized for the flavor or aroma imparted to foods. The more important ones are pot marjoram (*Origanum*), hyssop (*Hyssopus*), pennyroyal (*Hedeoma pulegioides*), basil (*Ocimum*), thyme (*Thymus*) and savory (*Satureja*). Hoarhound (*Marrubium*) is used in medicinal preparations and confections. The principal ornamentals include: salvia (*Salvia*), bugloss (*Ajuga*), lion's-ear (*Leonotis*), dragon-head (*Dracocephalum*), false dragon-head (*Physostegia*), Oswego tea (*Monarda*), skullcap (*Scutellaria*) and species of *Nepeta*, *Stachys*, *Teucrium*, *Thymus*, *Coleus*, *Lavandula* and *Pycnanthemum*.

Aristolochiaceae—*Aristolochia* and *Asarum*.

The Aristolochiaceae or birthwort family is of slight economic importance for its several ornamental species of Dutchman's — pipe, pelican flower or

birthwort (*Aristolochia*) and wild ginger (*Asarum*).

Gesneriaceae — *Columnea*, *Saintpaulia*, *Gloxinia* (*Sinningia*), *Episcia*, *Reclsteineria*, *Streptocarpus*, *Kohleria*, *Aeschynanthus* and *Achimenes*.

Economically, members of the Gesneriaceae or gesneria family are important primarily as ornamentals grown in the open in warm climates or under glass in the cooler regions. Species of *Ramonda* and *Haberlea* are prized as rock garden subjects in temperate regions. The most important ornamentals include: gloxinia (*Sinningia*), African violet (*Saintpaulia*), Cape primrose (*Streptocarpus*) and species of *Achimenes*, *Smithiantha*, *Kohleria* (*Isoloma*), *Aeschynanthus* (*Trichosporum*) and *Episcia*.

Solanaceae — *Solanum*, *Streptosolen*, *Cestrum*, *Datura*, *Solandra*, *Brunfelsia* and *Cyphomandra*.

The Solanaceae or nightshade family is a large family of about 85 genera and in excess of 2,200 species, distributed primarily in tropical America and South America. It is a family of considerable economic importance. It is the source of such food plants as the potato and eggplant (*Solanum spp.*), tomato (*Lycopersicon*), strawberry tomato (*Physalis*) and red pepper (*Cap-sicum*). Also in this family we find the fumitory, tobacco (*Nicotiana spp.*); such drug plants as henbane (*Hyoscyamus*), belladonna and atropine (*Atropa*) and stramonium (*Datura*). This family provides ornamentals from many genera including *Petunia*, *Salpiglossis*, *Schizanthus*, *Lycium*, *Solanum*, *Streptosolen*, *Cestrum*, *Datura*, *Solandra*, *Browallia*, *Nierembergia* and *Brunfelsia*.

Have you visited the garden lately? Make it a habit to do so often. Watch and help make Denver Botanic Gardens grow.

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# ECCENTRICS HAVE MORE FUN THAN PEOPLE

DR. FRED N. ZEINER

**A** LONG WITH GRAY HAIR and a fly-rod, my companion and I carry a butterfly net when tramping in the Rockies. But only "nuts" or kids are seen with such nets? Hah! We get the limit of trout early in the day, but we are not through for the day. There is no limit on bugs, neither is a license or extensive equipment required. All insects are fascinating, though magnification is necessary to demonstrate the beauty of many. A \$3.00 pocket lens suffices for this. Of more importance, we have "netted" good friends in this way, such as Shorty and Mabel of Ophir.

We were spotted by the latter, thanks to net, through a veritable cloud of *Celerio lineata* (Fig. 1). Incidental to providing information concerning these beasts, we established a lasting friendship. This moth is common in Denver and is popularly called the "White-Lined-Sphinx".

These are moths of the family Sphingidae. Common names are: hawk-moth, because they are swift fliers; humming-bird moth, since they hover with rapid wing-motion, and have the size and conformation of a humming-bird while sipping nectar at dusk;

sphinx-moth (Figure 2), as the larvae assume a sphinx-like pose when disturbed from feeding on your favorite tomato plants; horn-worms, as there is a spine in the form of a slender horn from the eighth abdominal segment. This variety of common names suggests the confusion that has resulted in the necessity of technical names in the universal language of Latin, hence, *Celerio lineata*.

Moths generally are nocturnal, so we are most apt to observe them at dusk. With this type of lighting, it is very easy to mistake them for humming-birds. In our garden they appear to prefer phlox. However, the heavy concentration of *Celerio* mentioned above near Ophir was seen near noon in the brilliance of high altitude sunlight. Perhaps these specimens had not read the learned tomes saying they should be nocturnal? Or, were learned tomes not available here? Probably the human authors spent too much time in the laboratory (or committee meetings)!

Frequently juvenile members of this family are found in home gardens on tomato plants. The best control measure is simply to pick off the larvae (they don't bite) and dispose of them.

Since their coloring and pattern represents camouflage at its best, a sharp eye is required. Presence of chewed leaves serves as a guide-post for where to look closely. I generally leave this chore to my companion, since she seems to derive vicarious pleasure from pitching the offenders into the incinerator.

A consolation prize is available for those who miss some of the larvae in the above-mentioned process. The adults of your tomato-worms are beautifully and wonderfully made creatures of nature.

P. S. Grasshoppers make for good fishing. They are easier to catch with a net.

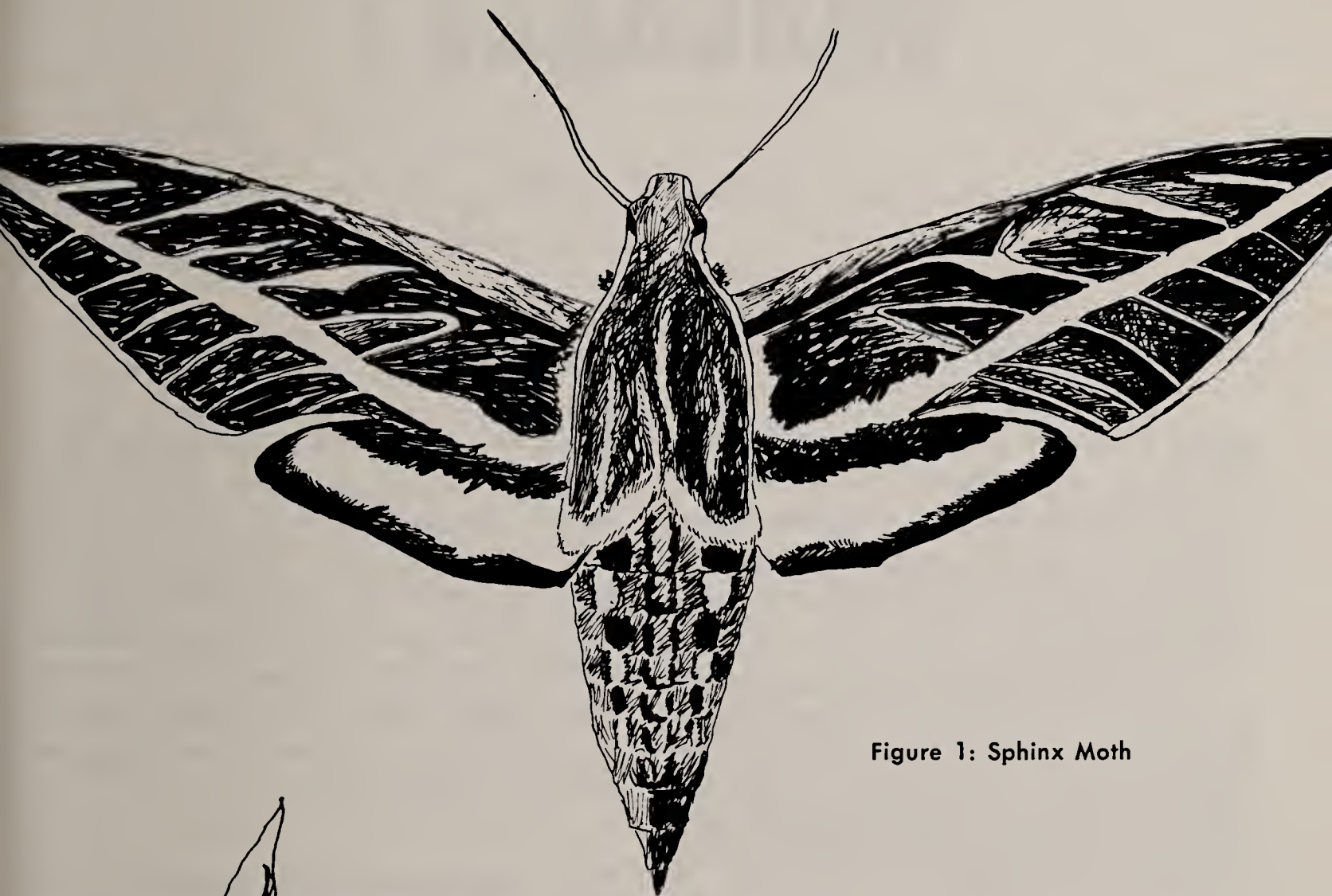


Figure 1: Sphinx Moth

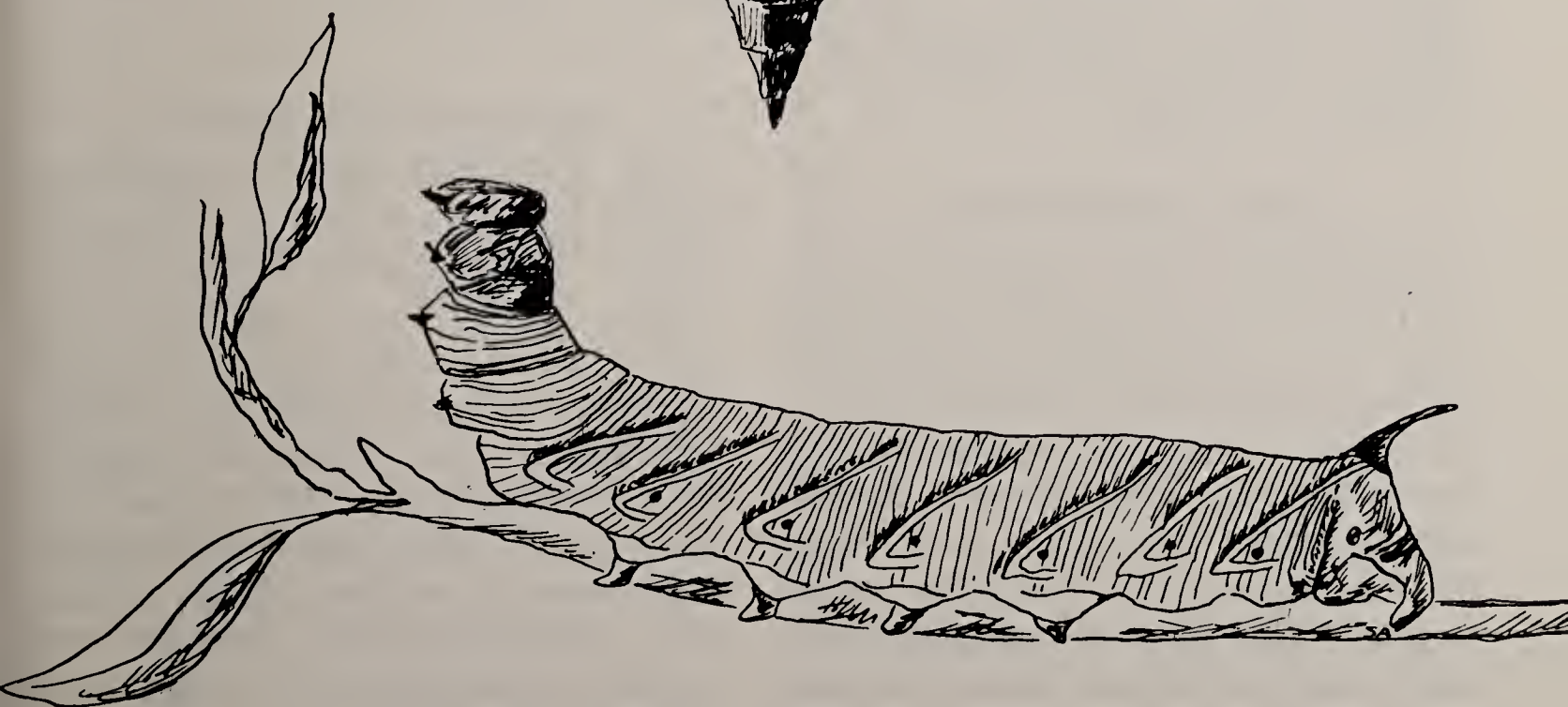


Figure 2: Larva of the Sphinx Moth

# ARE BUCKWHEATS PANCAKES ?

JOSEPH W. OPPE

**N**O, BUCKWHEATS are not pancakes. Yes, the achenes of a member of the Polygonaceae or buckwheat family are milled and the resultant flour used in the preparation of buckwheat pancakes.

The Polygonaceae is comprised of herbs, vines, shrubs and trees. It encompasses some 30 to 40 genera and approximately 800 species which are widely distributed in the temperate and subtropical countries.

## Family Characteristics

The family is quite diverse but its representatives will generally exhibit one or more of the following characteristics: Leaves mostly alternate (sometimes opposite or whorled), simple and entire. Stipules, when present, form a sheath (ocrea) around the stem. (Figure I.) Stems jointed and often containing a sour juice. Flowers generally small and numerous, usually perfect but sometimes polygamous or dioecious.

Perianth sometimes petaloid and in a single series or sepaloid and in two series. Perianth two to six-parted or cleft. Stamens mostly four to 12, separate and opposite the perianth parts or inserted at the base of the perianth tube. Pistil one, superior, the ovary one-celled, one-ovuled, styles two to three. Fruit a lenticular or triangular achene. (Figure II.)

## The Family in Colorado

The buckwheat family is represented in the flora of Colorado by six genera. Two of these, *Fagopyrum* (true buckwheat) and *Rheum* (rhubarb), are represented by cultivated species that escaped from cultivation and became naturalized. The other four genera have approximately 100 species and the bulk of these are in the genera *Polygonum* (knotweed) and *Eriogonum* (umbrella plant). *Oxyria* and *Rumex* are the other two genera that occur in our state.

## Common Genera and Their Characteristics

*Polygonum* or knotweed is a genus containing about 200 species. Several of these are grown for ornamental purposes but the majority are noted for their "weedy" nature.

The knotweeds are annual and perennial herbs, aquatics or more or less woody climbers. Stems are conspicuously jointed; leaves simple and entire with well developed ocreae; flowers small and numerous with bright perianth in racemes, spikes or heads; perianth mostly five-parted; stamens usually five; style two to three-parted; achene lenticular or triangular, enclosed by the persistent perianth. (Figure III.)

Among the ornamental knotweeds, *Polygonum auberti*, the silver vine fleece-flower, is probably best known here in Denver. An extremely hardy vine, it is easily recognized by the numerous, fragrant, white flowers which occur throughout the summer.

There are also three or four other species of *Polygonum* which are grown in the Denver area. The dwarf Japanese fleece-flower (*P. cuspidatum compactum*), which is used as a ground cover, is probably the best known. Its small, greenish white flowers are borne in axillary clusters and occur in the late summer. The dwarf Japanese fleece-flower is often sold under the incorrect name of Reynoutria fleece-flower (*P. reynoutria*). The two can be readily distinguished as the Reynoutria fleece-flower is only 4 to 6 inches high and has pinkish red flowers while the dwarf Japanese fleece-flower is 1½ to 2 feet high and has greenish white flowers. Both of these species grow quite rapidly, tend to get out of bounds and once established, they are ex-



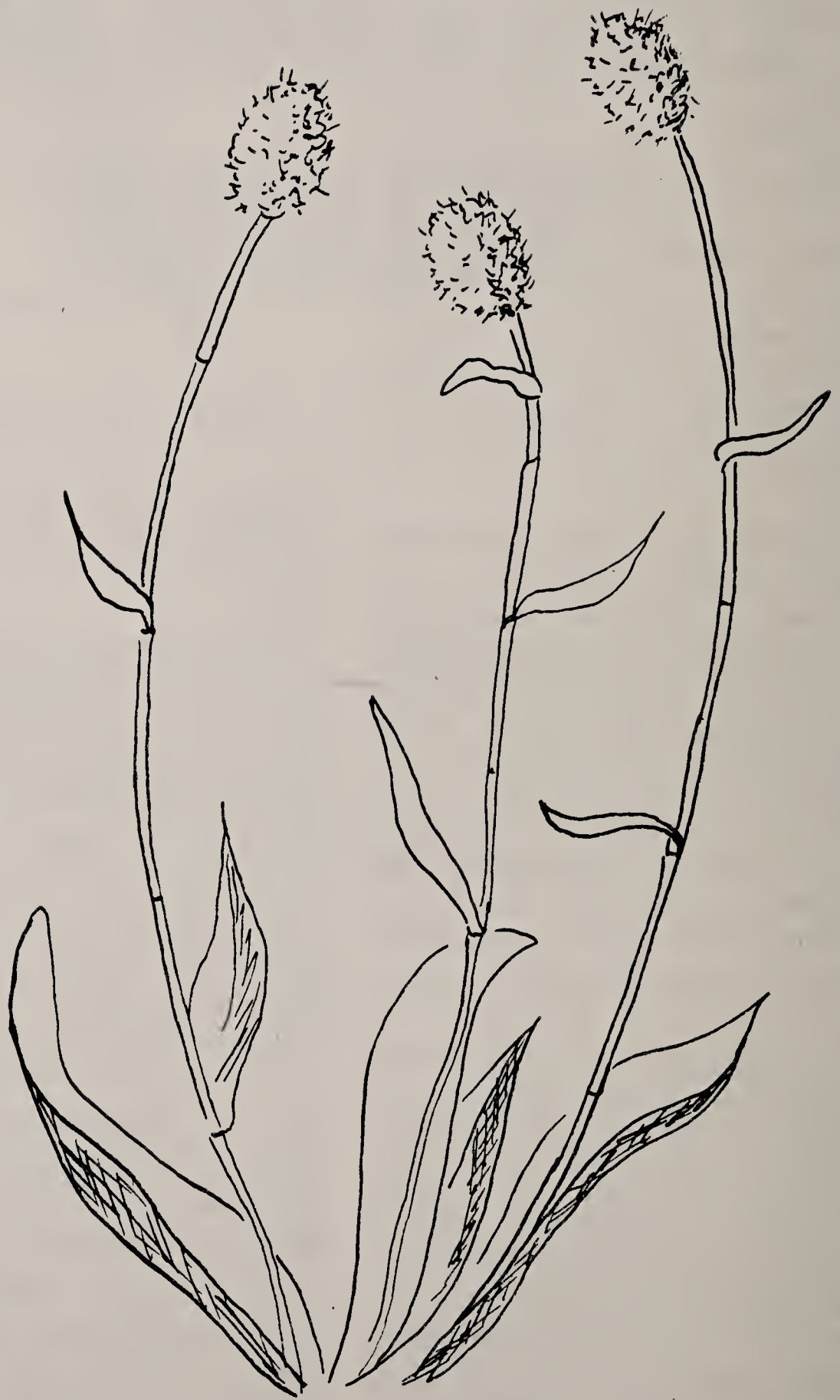
Figure 1. *Polygonum* leaf and sheath.

tremely difficult to eradicate. This should be kept in mind when selecting a planting location for either of these species.

The Japanese fleece-flower or Mexican bamboo (*Polygonum cuspidatum*) is also grown as an ornamental perennial in our area. It is taller than *P. cuspidatum compactum*, often reaching 6 to 8 feet in height and is somewhat less aggressive in its growth habits.

*Polygonum bistortoides* (American bistort) is among the better known native species of the buckwheat family. It occurs frequently in the mountains at elevations of 7,500 to 12,500 feet and is a conspicuous member of the alpine flora. It is easily recognized by its solitary, spike-like inflorescence of light rose to white flowers.

*Fagopyrum* or buckwheat contains about a half dozen species. Natives of Europe and Asia, the buckweats are annual or perennial soft-stemmed herbs. They are closely allied to the knotweeds but may be distinguished from this genus by the fact that their achenes project well beyond the per-



*Polygonum bistortoides*

sistant perianth. The leaves of *Fagopyrum* are alternate, deltoid or hastate and angle-lobed. The small white flowers are borne in racemes or dense corymbs and have eight stamens and three stigmas. The fruit is a three-pointed achene. The name *Fagopyrum* was derived from the Greek and means "beech wheat" alluding to the likeness of its fruit to a beechnut. (Figure IV.)

The common buckwheat, *Fagopyrum esculentum*, is the best known representative of this genus. A native of central or northern Asia, *F. esculentum* is grown as a crop in cool, moist climates and is well adapted in areas with short growing seasons. It is commercially important in the northeastern United States, northwestern France and eastern Europe.

In the United States, most buckwheat seed is used for stock feed. Buckwheat flour is used in our country to make pancakes but in Russia and Poland, it is a basic dietary item.

*Rheum* or rhubarb is made up of some 25 species which are native to Asia. The rhubarbs are stout perennial herbs having clumps of large, radical leaves with long and prominent ocreae. The flowers are small, numerous, green or white and borne in paniced fascicles or racemes. Perianth six-parted, stamens mostly nine, styles three, achene becoming strongly winged at maturity.

*Rheum rhaponticum*, the garden rhubarb, is the best known representative of the genus even though some other species are grown for ornamental purposes. Garden rhubarb has been known for years and was reported as being used in China as a medicinal in 2,700 B.C. The petioles of the garden rhubarb are the portions which are used in preparing pie fillings and preserves. The lamina or blade of the leaf is said to contain a mildly poisonous substance.

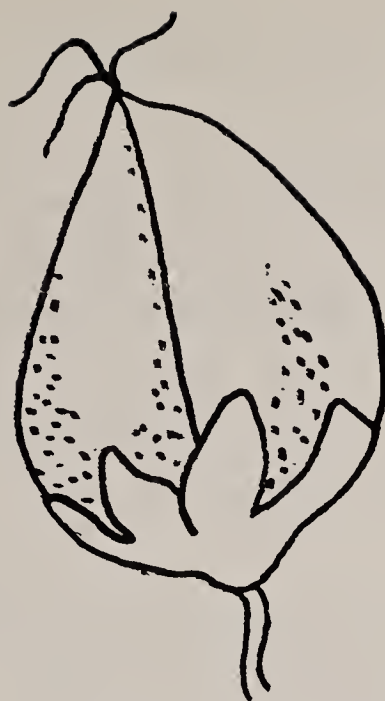


Figure 2. *Fagopyrum* achene.

*Eriogonum* is a genus of about 150 species of annual and perennial herbs or shrubs. They are recognized by their entire, exstipulate, alternate, opposite or whorled leaves; four to eight-lobed involucre, with several to many flowers; flowers perfect; calyx petaloid, six-parted; stamens nine; styles three; achene triangular.

*Eriogonum* is represented by approximately 55 species in the Colorado flora. *Eriogonum umbellatum*, the sulphur-flower, is probably the best known of all these native representatives. Its bright yellow perianth makes it a conspicuous element of the native flora. It occurs on dry, rocky areas, from the foothills to the subalpine zone.

*Rumex*, the docks or sorrels, are perennial herbs, which are widely distributed in the temperate zone. There are 125 or more species of *Rumex* and 15 of these are represented in the Colorado flora. Most of the docks are "weedy" in nature although a few are utilized as greens for preparing salads.

The docks can be recognized by their hastate, entire leaves; bisexual or unisexual, green flowers; deeply six-parted perianth. (Figure V.)

## BUCKWHEATS AND HORTICULTURE

The buckwheat family, as was previously mentioned, encompasses several plants that are horticulturally or agriculturally significant for either ornamental or food purposes. Included within the family are also many plants important because of their "weedy" nature.

Many of the species of *Polygonum* may be classed as "weeds". Chief among them are *P. convolvulus*, the black bindweed, which is sometimes mistaken for the morning glory and *P. aviculare*, the common knotweed, which is a bad "weed" in cultivated ground over most of the United States. Walter Muenscher in his book *Weeds*, lists 19 species of knotweeds which may be considered as "weeds".

The docks or *Rumex* also contain a number of aggressive, unwanted species. *Rumex crispus*, the curly dock, is probably the most common and occurs as a "weed" in gardens and cultivated ground.

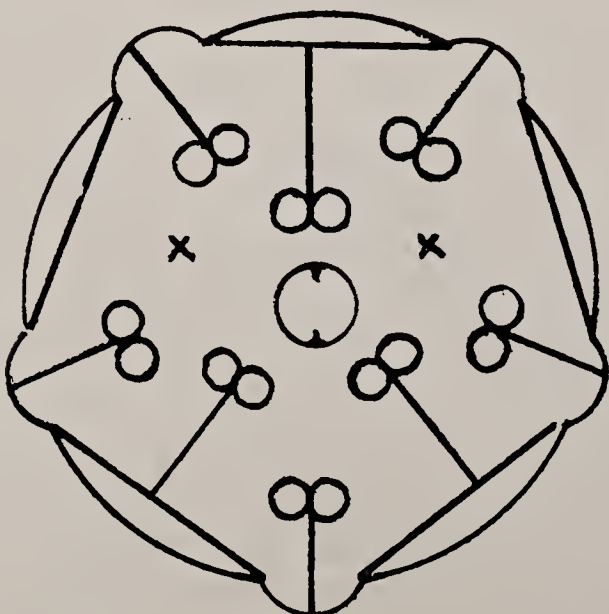


Figure 3. *Polygonum* floral diagram.

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## GLOSSARY

- Achene — A small, dry, indehiscent, one-seeded fruit.
- Alternate — Leaves located singly at a node.
- Bisexual — A flower that has both stamens and pistils.
- Calyx — The outer whorl of the flower which is made up of sepals.
- Corymb — A rounded or flat-topped inflorescence with pedicels being attached along the axis, the lower pedicels being longer.
- Deltoid — A broadly triangular leaf with straight base and sides curved toward the apex.
- Dioecious — A species that has unisexual flowers which are produced on separate plants.

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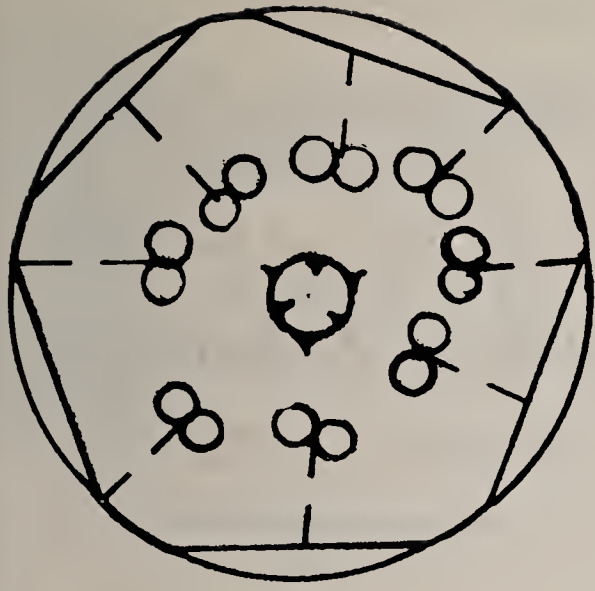


Figure 4. *Fagopyrum* floral diagram.

- Entire — The leaf margin unbroken or without teeth.
- Exstipulate — Leaves not having stipules.
- Fascicle — A cluster or bundle.
- Hastate — A leaf shaped like an arrowhead but with divergent lobes at the base.
- Head — A dense inflorescence of sessile flowers borne on a broadened base.
- Involucre — A whorl of bracts subtending an inflorescence.
- Lenticular — Lens-shaped.
- Node — A point on the stem where leaves or branches are attached.
- Ocrea — A stipular sheath surrounding the stem.
- Opposite — Leaves located one on either side of a node.
- Ovary — The enlarged lower portion of the pistil which contains the ovules.
- Panicle — An elongate inflorescence with compound branching.
- Perfect — A flower having both stamens and pistils.
- Perianth — The calyx and corolla collectively.

- Petaloid — Resembling a petal in color, usually not green.
- Pistil — The female reproductive organ of the flower.
- Polygamous — A species that produces some perfect and some unisexual flowers on the same plant.
- Raceme — A long inflorescence, with a simple pedicel, which blooms from top to bottom.
- Sepaloid — Resembling a sepal in color, usually green.
- Simple — The blade of the leaf in one piece.
- Spike — A long inflorescence with sessile flowers.
- Stamens — The male (pollen-producing) reproductive organ of the flower.
- Stigma — The enlarged terminal portion of the pistil to which the pollen adheres.
- Style — The stalk-like part of the pistil which connects the stigma and ovary.
- Superior — The ovary is attached above the point of attachment of the other flower parts.
- Unisexual — A flower that has either stamens or pistils, not both.
- Whorled — Three or more leaves located at a node.

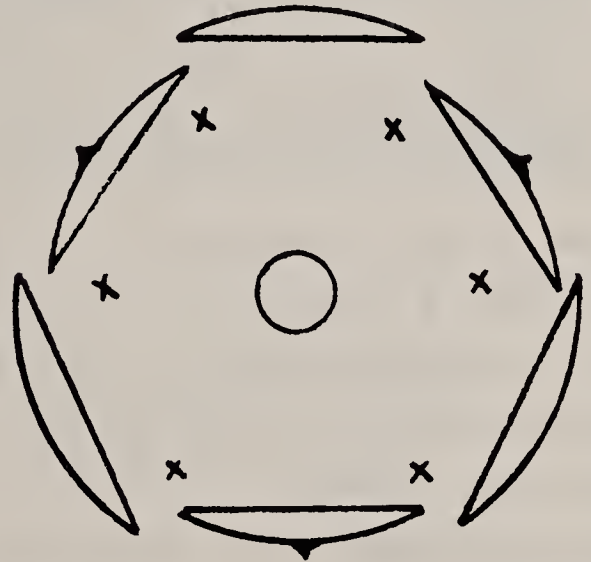


Figure 5. *Rumex*, floral diagram of pistillate flower.

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A Publication of Denver Botanic Gardens

SEPTEMBER

1965



Rose Culture in the Denver Area  
*A Special Issue*

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Vol. 22

SPECIAL ISSUE



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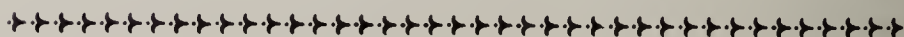
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### THE COVER

'GARDEN PARTY'

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# ROSE CULTURE IN THE DENVER AREA



*The Author, CLYDE E. LEARNED*

CONSULTING ROSARIAN FOR  
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# Some Notes About the Author

*"People want to learn how to grow roses. I have enjoyed working with flowers for 47 years. Dahlias, irises, peonies and gladioli have had a good share of my attention but I sincerely believe, after 25 years of growing roses, that this is the most rewarding flower for anyone's garden."*

The above is a quotation from Clyde E. Learned, consultant rosarian for Denver Botanic Gardens and author of 16 articles on rose culture for *The Green Thumb*. His interest in roses, starting out as a hobby, has become an avocation that enriched his own life and, because of his generosity, has been a boon to rose lovers throughout the Denver area. Many years ago it was a popular belief that the climate and soil conditions in Denver were not suitable for rose culture. Mr. Learned has helped to prove that this theory was false. He has shared the knowledge he acquired on the subject by addressing innumerable garden clubs and answering individual questions as consultant for Denver Botanic Gardens.

There are many beautiful rose gardens to be seen flourishing in Denver and environs today and there are many differing opinions as to the proper culture of this favorite flower of all ages. However, Mr. Learned has developed such good techniques for planting, protecting, fertilizing and wintering roses that we are proud to present in this special rose issue of *The Green Thumb* his formula for achieving fine results in any home garden.

Although Mr. Learned's name is familiar to many people because of his zeal in acquiring new members for Denver Botanic Gardens and the now dissolved Colorado Forestry and Horticulture Association (1575 total) and because of his activities with the Denver Rose Society, there are probably many who will study this issue of *The Green Thumb* and wonder what kind of person this is who enjoys spending so much time acquiring and disseminating knowledge about a lovely flower.

He might be called a "trail-blazer" since his chosen profession was that of Highway Engineer with the United States Bureau of Public Roads in 1918 following his graduation as a Civil Engineer from Worcester Polytechnic Institute in Massachusetts. If this seems like a rather rugged and far-fetched beginning for a dedicated rosarian, it's a fact. Amongst many of his early, challenging assignments, he helped to develop the first highway over Berthoud pass out of the tortuous trails which existed prior to this highway project. He supervised road maintenance and construction work in Rocky Mountain National Parks and helped

to chew a long, modern highway out of slimy mud and rock in Canada and Alaska, now, a much traveled road known as the Alcan Highway. He also served as Consulting Engineer for a mountain highway project in Guatemala, Central America.

During the course of this interesting

career, an appreciation for landscape beautification emerged from his assignments on many landscaping projects in the National Parks and Forests under the jurisdiction of the Federal Government. Here the relationship between his two major interests — one a hobby, the other a vocation—becomes

### 'MONTEZUMA'

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plausible. From landscape beautification there arose a natural interest in some flowering plants and a curiosity about their culture and rewarding qualities in the home garden. The hobby was taking hold and many flowers were tried, but only one was chosen — the rose.

In his own lovely rose garden in Denver, the beds have gradually encroached on other plantings to the extent that there is now one small patch exclusively the property of charming Mrs. Learned — her rhubarb patch, which she wistfully hopes will withstand the rose tide! She is very philosophical about the future, though, and aids and abets her husband in every way possible in pursuit of his hobby. Having traveled with him on many of the road-carving expeditions, she has learned to accept the inevitable with a cheerful good humor that is characteristically hers.

In addition to other activities, Mr. Learned was Membership Chairman for The Denver Rose Society for many years and served on the Board of Directors of the society helping to develop it into the remarkable organization it is today. He also held the position of Chairman of the Annual Rose Show — an office of gargantuan size and tasks.

There was still a little time to indulge his interest in philately, a hobby which he passed on to his children, Jack, Norma and Gordon. His youngest son Gordon has also inherited the fondness for roses and has exhibited and won many ribbons in Annual Rose Shows.

When Clyde was asked how many blue ribbons he has acquired over the years, he laughed, shrugged and admitted to a “trunkful” of several hundred, at least. One doesn’t bother to count these honors — there is always another challenge to work for, includ-

ing “Queen of Show,” also in his collection. His favorite roses? ‘Tropicana’, orange-red hybrid tea, and ‘Pink Parfait’, dawn pink grandiflora.

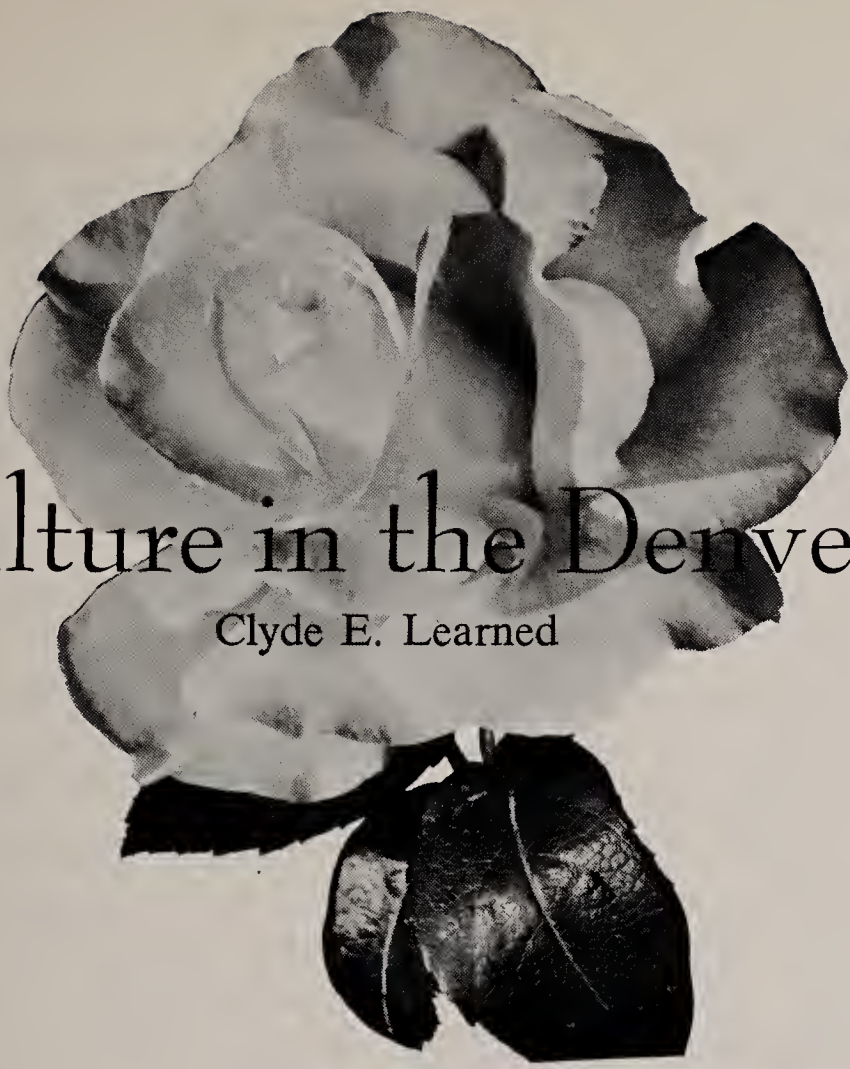
This is a thumbnail sketch of a very busy, energetic man who always does things thoroughly with painstaking attention to even minor details. He is a wonderful person to have for a friend and can always be depended upon to help out in an emergency. The publication which you are about to read and, no doubt, consult many times, is the product of the 25 years he spent in exploring all the wonderful possibilities for developing beautiful roses.

This rose issue of *The Green Thumb* is gratefully dedicated to Clyde E. Learned and, in a sense, to all who follow in his path to promote beauty in this wonderful country “one mile closer to the sun.”

### ‘MATTERHORN’

Courtesy All-America Rose Selections





# Rose Culture in the Denver Area

Clyde E. Learned

## INTRODUCTION

For 25 years the author has been growing roses in the Denver area and for the last 10 years has been writing rose articles which have been published in *The Green Thumb*. In these articles an effort has been made to outline and describe the methods employed and the results obtained in the several operations and phases of this popular and evergrowing activity.

It is believed that a review of the rose articles prepared by the author and published in *The Green Thumb* might bring out certain features which would bear repeating at this time. It is also necessary to bring up to date the recommended lists of roses furnished in previous articles by including a number of newer and more popular varieties.

## TIMETABLE AND METHODS

In this section an attempt will be made to answer some of the many questions asked regarding methods of growing roses in this Rocky Mountain region and also to provide a timetable for the various necessary operations. As conditions vary somewhat in the several areas of the region, the provisions applying to Denver and vicinity are being considered as average. At higher and cooler locations, where roses can be grown, the dates for many of the spring operations would normally be delayed one or two weeks. On the other hand, at lower and

warmer altitudes, as in the Arkansas Valley, the dates given would be advanced one or two weeks. Of course there are always exceptions as, for example, when roses are grown on a protected hillside location with little wind and a lot of sun.

Instructions given are intended to apply primarily to the roses most generally planted in this region — hybrid teas, floribundas and grandifloras. A few suggestions are also offered regarding climbing roses. The timetable is designed to start with the first operation in the rose garden in spring and

to continue through the months until the roses have received their final preparation for winter.

### Buying

In planting roses in the spring, try to get them in during the last week in March or the first two weeks in April. At that time the ground is in good condition to work and a better selection of roses is available at the nurseries.

If planting is delayed until after the middle of May or if a rose bed is to be planted during the summer, the solution is potted roses in full foliage and often in bloom. Potted roses are handled by most local nurseries and cost about 50¢ more per bush than bare-root roses. In putting in a new rose bed remember that it takes a little time for some varieties to get established, so don't get impatient if new rose bushes do not produce a riot of color the first year.

When buying roses, it is well to buy from the old-line nurseries which specialize in roses or from reliable local nurseries or seed stores, all of which guarantee their roses and will replace them if they are planted according to instructions but do not live. It is a mistake to purchase bargain roses which are usually inferior plants, culls or the leftover dehydrated stock at the end of the season.

### Planting

Before doing any planting, check the drainage of the proposed bed by digging a hole about 12 inches deep and filling it with water. If at the end of two or three hours the water has seeped away, the drainage is probably satisfactory. If the water does not drain, try another location or provide sub-drainage, which is sometimes a rather difficult and expensive undertaking. Roses will not tolerate a location where

their roots are continually wet. Sometimes drainage can be improved by elevating the beds above the surrounding ground or by digging a deep hole for each individual rose (at least 2½ feet deep) and then backfilling about half the hole with coarse sand or gravel.

Be sure roses are planted where they will be free of root competition from trees, shrubs and other plants with spreading roots. Roots of most evergreens, especially Pfitzer and upright junipers, do not spread very far and roses can often be planted very close to them with good landscape effect.

Prior to planting bare-root roses it is a good practice to place the new roses in a tub of water for one or two hours to improve the moisture content. In the actual planting of the rose, dig a hole about 18 inches deep and about 12 inches across, spread the roots over a conical mound of soil in the bottom of the hole, then backfill with a soil mixture while adding water and then tamp the mixture lightly but firmly around the roots. A sawed-off baseball bat makes a good implement for these tamping operations which are performed for the purpose of removing the larger air pockets. Do not pound and compact the soil to such an extent that all air is removed, as air in the soil is essential for proper growth. Keep in mind that there is not much sense in going to the trouble to excavate a good hole unless a good plant is going to be placed in it. On the other hand, there is not much sense in buying a \$3.00 to \$3.50 rose and then planting it in an improperly prepared hole. It is a good idea to try to anticipate the planting of additional roses by digging the holes the prior fall. The holes are backfilled with a carefully prepared soil mixture to which is added two to three handfuls of superphosphate. Then, when the

roses arrive in the spring, re-excavate the hole and plant the rose.

In planting new roses there is always the possibility that the material taken from the hole may be so poor or sterile that it is desirable to improve it by adding peat, cow manure, compost and good garden soil. In extreme cases, it may be desirable to throw away all the excavated material and backfill the hole with a mixture of about 30% peat moss, 20% manure or compost to which about 50% loamy topsoil has been added. It is also desirable to add two or three handfuls of superphosphate to the mix. The addition and mixing of these organic materials with the usual garden soil promotes aeration and results in more and better roses.

In the planting of roses in Colorado it is recommended that the bud union be placed at the ground level or even an inch below the surface. In the summer, the spreading of a good mulch on the soil surface reduces cultivation and possible root injury, that might result from cultivating too deeply around the base of the plant. Later in this article it is recommended that at least an 8-inch winter protective cover be provided, which means that the bud union will then have good protection during the winter.

One of the most important and neglected factors in planting bare-root roses is the mounding of soil 8 to 10 inches high around the canes to prevent the new plant from becoming dehydrated by the sun and drying winds and to give it an opportunity to become established. The mound should be kept moist for two weeks to a month. The earth cover can be removed when a number of little, hair-like shoots, about an inch or so in length, appear growing out of the plant.

If feasible, the final uncovering should be performed in stages, that is, remove a portion of the protective earth cover and then a few days later remove the remainder. Some people use a gentle flow of water from a hose to remove the cover with excellent results. This final uncovering requires extreme care, as usually by this time the roses have put out a number of tender shoots which can easily be damaged.

The question of moving established roses comes up every year. Nurserymen appear to agree that the best time to move them is in the spring during March or April. Sometimes it is necessary to move them in the late fall or early winter. The procedure is to dig up the rose and temporarily heel it in

### 'TIFFANY'

Courtesy American Association of Nurserymen



## PLANTING (cont.)

for the winter in a trench 6 to 8 inches deep. The roses are placed flat in the trench and covered completely with about a foot of soil.

When planting container-grown roses, select the planting site and prepare the planting hole in the same fashion described for bare-root roses. Remove the plant from the container and place it in the planting hole. The bud union should be placed at, or an inch or so below, the ground level.

Do not soak container-grown roses in water prior to planting and make every effort to see that the soil around the roots remains intact. It is, of course, impossible to spread the roots of container-grown roses over a mound of soil in the bottom of the planting hole as the roots are contained within a ball of earth.

In the case of roses grown in metal cans, it is a good idea to have the nurseryman split the can. This makes it a great deal easier to extract the plant from the container.

It is not a good idea to compact the soil around the roots of container-grown plants. It is also not necessary to mound the soil around container-grown roses that are planted after the middle of May.

## Watering

Roses require lots of water and most sprinkling systems do not supply an adequate quantity of water to the roses, which are deep-rooted plants. A canvas soaker or water bubbler attached to the hose usually does a satisfactory job. There is no set rule for watering roses as soil conditions in Colorado are so variable. Light sandy soils absorb lots of water and do not hold it

long. In summer, roses in sandy soils may need water every three or four days but in sandy clay or loamy soils the watering interval may be up to a week. Heavy clay soils hold water and may go for periods of two to three weeks without irrigation. Usually the best guide is to dig a small hole and check the moisture content of the soil. An occasional watering during the winter, particularly in open and exposed areas, is recommended.

## Pruning

Following a normal Colorado winter, nature has pretty well determined the height of preliminary spring pruning. In these preliminary pruning operations, which are normally performed about the middle of April, the canes are cut back to live wood (usually green in color) with a clean slanting cut just above a good eye or bud. The date of uncovering and performing the final spring pruning in Colorado, with our erratic weather, is a rather touchy subject, as most people are aware. It is difficult or impossible to give a definite date on which these operations can be performed safely. However, records show that established roses may be given their final spring pruning between May 5 and 10. At that time, a start may also be made on removing the winter covering.

In pruning, try to keep the rose as shapely as possible. Remove all injured or diseased canes and all twiggy and candelabra growth. When the final pruning is finished, there should be from four to six good canes which will range from 6 to 18 inches in height. Following winters as mild as those of 1963-64, it might be possible to save wood up to a 30-inch height. Keep

in mind that good green canes store reserve food and that every bit of good solid wood saved will nourish and improve the early summer growth and flowers. All new cuts should be brushed with an asphaltic or other approved sealing compound to keep out the destructive cane borers.

The pruning of climbers is an entirely different operation, as the flowers are normally on old wood which usually lasts two to three years. Climbers are pruned about the middle of April when about a third of the old canes, together with a tangle of side shoots, are cut out. These operations require gloves.

### Fertilizing

To produce roses of superior quality and in great numbers over a period of years, it is essential that some form of nourishment be added occasionally to the soil. The methods followed and the types of fertilizer used, vary with the individual growers.

In a rose planting, the soil acts first as a container and support to hold the bushes in place. The soil also supplies most of the nutrient elements needed for growth and development of the plants and flowers.

Often it is found that the soil is either too heavy or too light. In such instances a change in texture will be beneficial — sand, manure, peat, or a combination of the three, will improve heavy soils and the addition of organic matter and a little clay will improve light-textured soil.

The most effective method of building up a soil that is in poor condition for rose growing is to incorporate thoroughly and deeply into the root zone organic matter such as peat, compost or well-rotted manure prior to planting.

Most people are aware that there are two schools of thought about the use of fertilizers — one group being of the opinion that all fertilizers should be of “organic” origin whereas the second group is just as firmly convinced that “inorganic” fertilizers are equally or more effective.

“Organic” fertilizers have their sources in plants or animals. The division of fertilizers into “organic” and “inorganic”, once very clear-cut, has now become rather hazy, because such organic materials as urea and ureiform are now being synthesized in chemical factories.

Typical organic fertilizers are animal manures, bone-meal, dried blood, cottonseed meal, fish meal and composted waste from the garden. Inorganic fertilizers include such chemical products as ammonium sulphate, ammonium phosphate, potassium sulphate, superphosphate and formulations under such trade names as Vigoro, Rapid-Gro, Wonder-gro, Morgro, Ortho-grow, Triogen Rose Food and many others.

Many rose growers consider it advisable to use both organic and inorganic fertilizers. More and more, however, gardeners are relying on inorganic materials as a source of nutrient elements and are employing organic materials such as cow manure, peat and leaf mold largely for improving the physical condition of the soil and as mulches.

Because of their higher solubility, the chemical fertilizers are generally much quicker acting than the raw organic fertilizers. Chemical fertilizers must be used with caution as an overdose may cause severe injury. Frequent small doses are more desirable than large single applications.

'APRICOT NECTAR'

Courtesy 1966 All-America Rose Selections



## FERTILIZING (cont.)

About 16 different nutrient elements are required by roses. Some are obtained from the air, some from water and most from the soil. The average garden soil contains most of the necessary mineral elements. Some of these may be on hand in limited amounts; some may be practically unavailable to plants. Ones most likely to be deficient for field or garden plants are nitrogen, phosphorus and potassium.

Fertilizer laws require that manufacturers indicate on the container the percentage content of these "big three" elements. Thus a 100 lb. bag of 6-10-4 fertilizer contains 6 lbs. of nitrogen (N), 10 lbs. of phosphorus (as  $P_2O_5$ ) and 4 lbs. of potash ( $K_2O$ ).

In general a good rose fertilizer for Denver conditions will have about two times as much phosphorus as nitrogen and a potash content equal to or somewhat less than that of nitrogen. Although roses use a considerable amount of potash, our soils, particularly the clay soils, are usually rich in the material and not much needs to be added.

Many rose growers are very enthusiastic regarding the benefits to be derived from foliar feeding. In this region, the most popular of the fertilizers applied to the leaves is Rapid-Gro, which contains 23% nitrogen, 21% phosphorus and 17% potash, together with certain minor elements.

Recent investigations made under the auspices of the American Rose Society indicate that the relative acidity or alkalinity of soils has much to do with the growth and the condition of the foliage and blooms of roses. Experiments indicate that roses do not like either a strong acid or alkaline soil but do much better in neutral soils or a soil with a pH of about 6.5 to 7.0. The pH scale is an arbitrary gauge used to indicate the degree of acidity

or alkalinity. By using this scale, one determines whether the soil is alkaline (sweet) or acid (sour). Soils from pH 1 to 6 are acid, pH 7 is neutral and pH 8 to 14 are alkaline.

The following information may be of assistance in the establishment of a program for fertilizing roses: About May 15 or when the old or established roses have put out a number of sprouts, apply a surface application of cow manure and about  $\frac{1}{4}$  pound, two handfuls, of commercial fertilizer of about a 5-10-5 mix per bush. Apply a second application of commercial fertilizer a month later, about the middle of June. A third application about the first of August may be desirable.

Cultivate to mix the fertilizer with the soil and then water within a day or two. It would be well to avoid the use of nitrogen fertilizers after the middle of August, as the use of nitrogen tends to accelerate leaf and stem growth, with the result that you have succulent shoot development which is apt to get nipped by one of the early frosts before the plants have hardened off for the winter. It is satisfactory to use phosphorus and potash fertilizers during August and September as phosphorus develops the root system and potash hardens and strengthens the bush to withstand our winters. Many rose growers, especially those getting ready for a rose show, are enthusiastic regarding the benefits to be derived from foliar feedings. However, it is believed that foliar feeding should supplement rather than replace ground methods for fertilizing roses.

One thing is certain, attention to the soil and careful preparation of the beds and use of fertilizers makes for better roses. Even more care and additional work is necessary if you want to have plants that produce bumper crops of superior blooms.

# Disease and Pest Control

Although we are not troubled as much by diseases and pests as are rose growers in other parts of the country, it is well to begin the initial spraying or dusting rather early, usually about the middle of May, when the foliage is well developed. In many gardens it is necessary to spray or dust about every two or three weeks during the growing season.

Since there are so many first class insecticides, fungicides and miticides, it is impossible to advise which is best. Isotox, Scope, Karathane, Lindane, Captan, Malathion, Acti-dione, Evergreen and Tri-ogen have all been used, with very satisfactory results. As there is probably no all-purpose spray or dust, it may be necessary to try a number until one is found that appears to give the best control with the least amount of work.

If spider mites are a problem, Aramite seems to provide the best control. The use of a rather stiff spray of water from a garden hose on the underside of the leaves also helps control mites.

Ordinarily, mildew is not very prevalent before the latter part of August; however, it does occur as early as July when conditions are right. The amount of mildew is more or less determined by atmospheric conditions and the location of the rose bed. Roses planted against houses, tight fences, walls or under trees or at the bottom of a slope usually have more mildew than roses which are in the open and exposed to

good air circulation. It is much easier to control mildew before it gets a good start so it is recommended that applications of Karathane or Phaltan be applied early or at the very first sign of the disease.

Watch the old-fashioned ramblers, such as 'Dorothy Perkins' or 'Crimson Rambler' closely; they are very susceptible to mildew which soon spreads to the adjacent hybrid teas and floribundas. Better still, tear them out and replace them with some of the newer and more beautiful climbers which produce several crops of flowers during the blooming season.

Fortunately, blackspot is not very common in Colorado. Should blackspot occur, effective control can be obtained by applying Phaltan, Acti-dione, Captan or Karathane. Sulphur compounds, both dust and liquid, are still very popular. However, they should be applied early in the morning or late in the afternoon or when the temperature is below 80° Fahrenheit.

Iron deficiency chlorosis occurs commonly in roses which are grown in highly alkaline soils. The symptom of this physiological disease is a yellowing of the leaves. Death may follow if steps are not taken to supply available iron to the plants. Iron may be applied in the form of iron chelate or iron sulphate. Either of these will give satisfactory results if applied in accordance with the manufacturers' recommendations.

**'KING'S RANSOM'**

Courtesy All-America Rose Selection





# Winter Protection

Roses are relatively hardy and many varieties will go through the ordinary Colorado winter without too much damage. However, there are some varieties which are not very winter resistant and occasionally during a very severe winter, with wide and rapid fluctuations in temperature, the results are often disastrous if some form of protection is not provided. Actually, the greatest damage to roses is caused by a cold snap in the late fall and early winter when the canes are green and full of moisture or when a warm spell occurs during the winter followed by a cold period with a rapid drop in temperature. For example, the warm weather of February, 1965 followed by the five days of below zero in March, was very harmful to our roses, particularly climbers.

The two previous winters of 1961-62 and 1962-63 with their strong winds and periods of alternate thawing and freezing were extremely harmful to roses. This should have convinced all rose growers in this region of the need for adequate winter protection. However, the winter of 1963-64 was very mild and most roses came through without much damage.

Although the winter loss of roses is fairly large in Colorado, reliable data are not available to show actually what the comparative loss is on protected and unprotected roses. However, the results of a recent survey made by the members of the Cincinnati, Ohio Rose Society illustrate the need for adequate winter protection. This survey covered a total of 2,658 rose bushes and indicated there was only a 1% loss of roses

by the members who covered or protected their roses during the winter, whereas, the loss suffered by the members who provided no protection was 8% or eight times as much.

When covering roses for the winter, it is reasonable to assume that the greater the depth of cover the greater will be the protection afforded with the result that there will be more live wood and undoubtedly better quality blooms in the spring and early summer months.

### MOUNDED SOIL

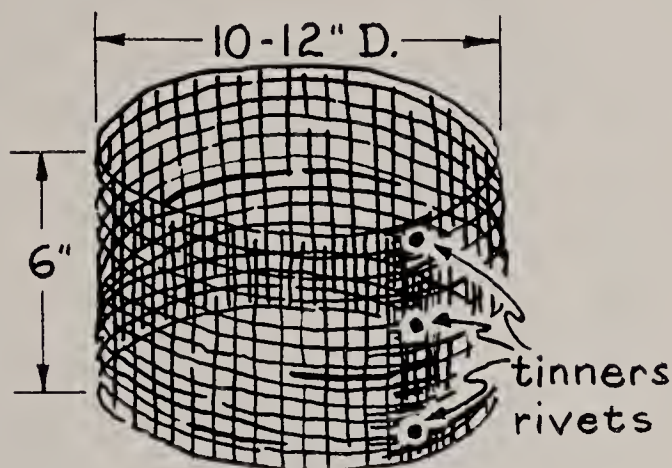


As rose shows are usually held during the last week in June it is also reasonable to assume that the exhibitors who cover their roses during the winter will have more and better roses to exhibit.

For protecting roses in the winter, the usual and most common practice is to build a cone-shaped mound of earth about 8 to 10 inches high around each bush. A fairly light top soil or sandy clay provides a good cover. Avoid material that packs hard and

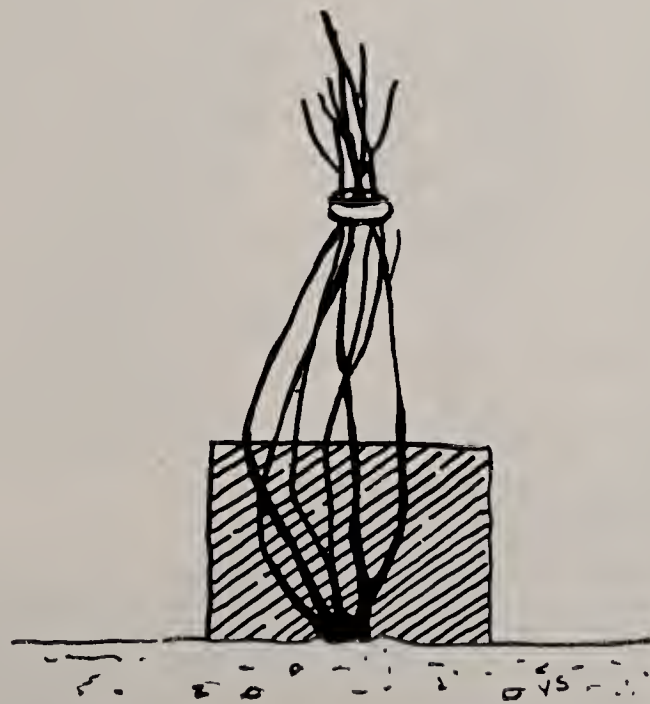
becomes soggy when wet. If feasible, it is suggested that the cover material be obtained from a source outside the bed rather than digging up material from the rose bed and possibly disturbing the roots. A planter box soil mix

### CYLINDER-TYPE PROTECTION



or a mixture of top soil and peat moss is ideal for covering roses. This operation is usually performed during late November or early December.

### WIRE CYLINDER



For a more positive winter protection it is suggested that open-end cylinders filled with soil be used. The cylin-

ders are made of galvanized hardware cloth, four meshes to the inch, are 6 inches high and of varying diameters ranging from 10 to 12 inches.

By varying the diameter it is possible to meet the needs of the small and larger roses and to nest the cylinders to facilitate summer storage.

Rose bushes sometimes are so large that the 12-inch cylinder is not large enough. In this case, it will be necessary to resort to a large cone-shaped mound of earth.

After the cylinders are filled with dirt give the beds a good soaking and then spread about 1 inch of cow manure or compost in the valleys between the rows of cylinders.

In making the cylinders, 6-inch strips of hardware cloth are shaped into a circle and fastened at the ends with three, 4-pound galvanized tinner's rivets which are a little over  $\frac{1}{8}$  inch in diameter and  $\frac{3}{8}$  inch long. The ends of the hardware cloth are overlapped three meshes or  $\frac{3}{4}$  inch, the rivets being placed and flattened in the middle mesh.

A 100-foot roll of hardware cloth 24 inches wide will make about 132 cylinders 6 inches high.

The roll is cut into strips 6 inches wide as follows:

10-inch diameter cylinder  $32\frac{1}{2}$  inches long.

$10\frac{1}{2}$ -inch diameter cylinder 34 inches long.

11-inch diameter cylinder  $35\frac{1}{2}$  inches long.

$11\frac{1}{2}$ -inch diameter cylinder 37 inches long.

12-inch diameter cylinder  $38\frac{1}{2}$  inches long.

The cost of the cylinders will range from 20 to 25¢ each, depending upon the price paid for the roll of hardware cloth.

In early November, to prevent cane breakage by high winds and heavy snows, the tops of the canes are cut back to a height of 30 to 36 inches and then tied together with cord making it easy to drop the hardware cloth cylinders down over the bush.

The cylinders are then backfilled around the canes with a sandy loam or other suitable material. It requires only about half as much material to backfill the cylinders as would be required for an equivalent height of unretained mound and a much more positive protection is given the rose bush.

As climbing roses are normally more hardy than hybrid teas, most climbers can be protected with a 3 to 4-inch cover of soil.

Regarding winter protection it might be well to add that the objective of a winter cover is not to keep the bushes warm but rather to provide an insulation and keep them from being damaged by a sudden and rapid change in temperature.

Of course, the ideal winter protection would be to have a blanket of snow on the bushes all winter. This is something that does not happen in this area.

'ROSE DUET'

Courtesy All-America Rose Selection





# A Selection of Roses

When purchasing new roses, the question is whether to buy the new and recently selected All-America roses, which are usually one to two dollars more per bush or whether to decide on a selection of the less expensive tried and true roses that have stood the test of time and are still the top favorites, as well as probably being the best buys.

The final decision will usually be, as it should be, a compromise in which a number of the recent All-America selections will be purchased and a greater number of the old reliables will be acquired.

In an effort to assist the new and less experienced rose growers, recommended lists of the best hybrid teas, grandifloras, floribundas and climbers from which to choose have been prepared. These selections are based on the experiences obtained in the City

Park and York Street Units of Denver Botanic Gardens as well as observations in many private gardens in this area.

In this connection, it is suggested that all rose growers — both new and old — visit the City Park Unit of Denver Botanic Gardens at least two or three times during the season to witness the gorgeous display of the “Queen of Flowers”. These visits offer a wonderful opportunity to inspect and select the roses that appeal for use in the home garden.

In the selection of roses it will be noted that the following 1965 recommended lists are quite similar to the lists which appeared in *The Green Thumb* in April, 1962 and March, 1963 except that a number of the promising newer creations have been added. In addition, a number of comments are furnished regarding the

1963, 1964 and 1965 All-America Rose Selections.

The hybrid teas recommended for 1965 are:

## HYBRID TEAS

1. 'Peace'.....	Yellow Blend	All-America in 1946
2. 'Crimson Glory'.....	Dark Red	Introduced in U.S. in 1935
3. 'Charlotte Armstrong'.....	Light Red	All-America in 1941
4. 'Chrysler Imperial'.....	Dark Red	All-America in 1953
5. 'Tropicana'.....	Orange-Red	All-America in 1963
6. 'Tiffany'.....	Pink Blend	All-America in 1955
7. 'Rubaiyat'.....	Light Red	All-America in 1947
8. 'Confidence'.....	Pink Blend	
9. 'Helen Traubel'.....	Pink Blend	All-America in 1952
10. 'Garden Party'.....	Nearly White	All-America in 1960
11. 'Mme. Henri Guillot'.....	Red Blend	Introduced in U.S. in 1938
12. 'Tally Ho'.....	Light Red	All-America in 1949
13. 'Sutters Gold'.....	Orange Blend	All-America in 1950
14. 'Kings Ransom'.....	Dark Yellow	All-America in 1962
15. 'Show Girl'.....	Medium Pink	
16. 'Nocturne'.....	Dark Red	All-America in 1948
17. 'Eclipse'.....	Medium Yellow	Introduced in U.S. in 1935
18. 'Granada'.....	Pink & Red Blend	All-America in 1964
19. 'Pink Favorite'.....	Medium Pink	
20. 'Chicago Peace'.....	Pink Blend	A Sport of 'Peace'
21. 'Duet'.....	Two-Tone Pink	All-America in 1961
22. 'First Love'.....	Light Pink	
23. 'South Seas'.....	Apricot Blend	
24. 'Ann Letts'.....	Pink Blend	
25. 'Saturnia'.....	Red Blend	

It is interesting to note that of the 25 recommended hybrid tea roses, 14 were chosen by the All-America Selection Committee as All-Americas, whereas, four of the roses — 'Crimson Glory', 'Mme. Henri Guillot', 'Eclipse' and 'Saturnia' were introduced from Europe into the United States prior to the establishment of the All-America Selections.

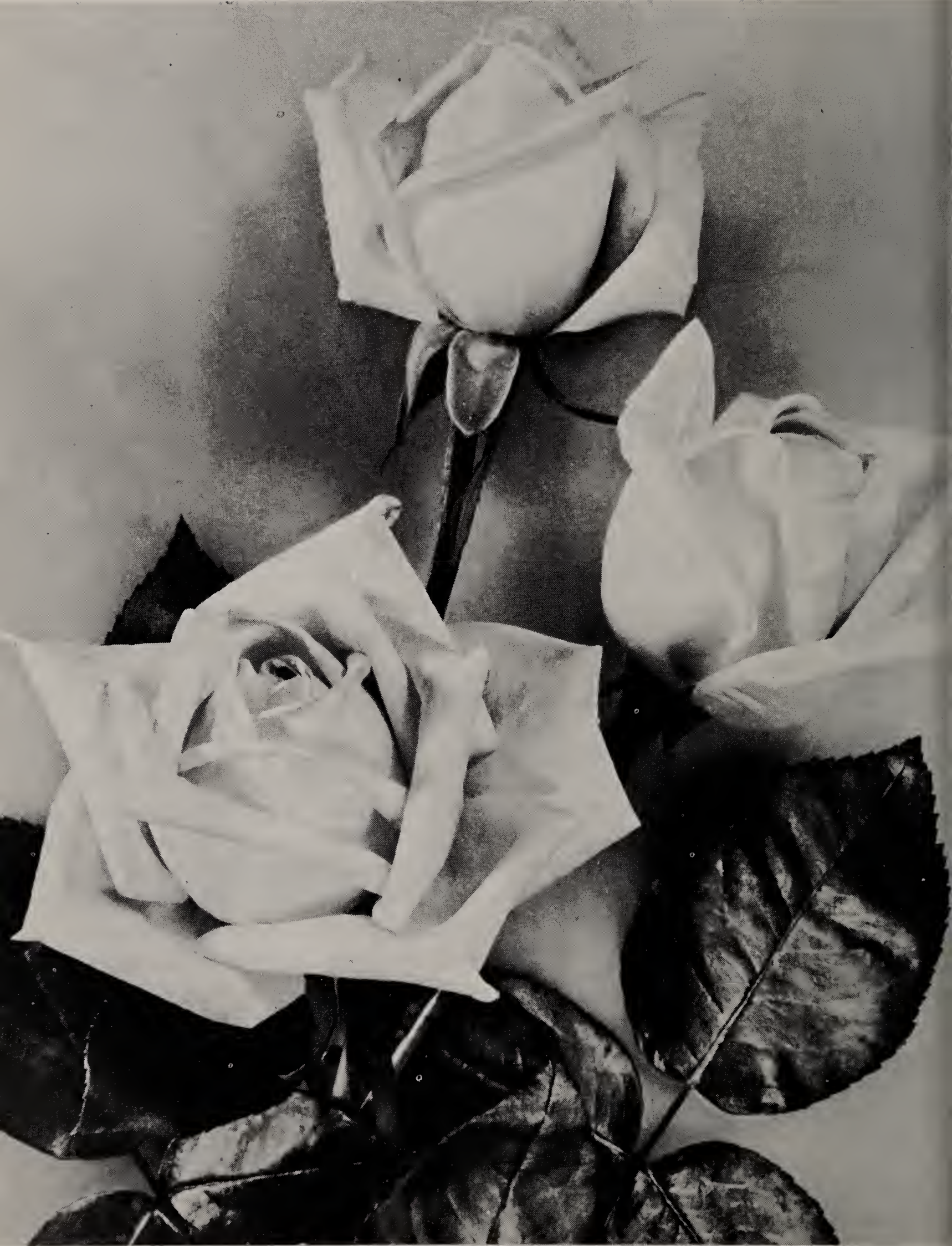
It is admitted that it is more or less of a toss-up in selecting the last six or seven roses in the above list inasmuch as there are a number of other excellent hybrid tea roses that do well in Colorado and that could have been included. However, it is believed that

this recommended list should be very helpful and satisfactory in making a selection. It is suggested that the best bargains in the above tabulation are 'Peace' and 'Charlotte Armstrong', since the patents have recently expired on these two varieties.

During recent years the grandifloras, which are a cross between the hybrid teas and floribundas, have performed very well in this region. In general these roses are a little taller than the hybrid teas and although some varieties in this class do have a tendency to cluster, they, for the most part, have individual stems which are long enough

'ROYAL HIGHNESS'

Courtesy All-America Rose Selections



for cutting and are excellent for exhibition purposes.

Grandifloras that are recommended include:

## GRANDIFLORAS

- |                               |               |                     |
|-------------------------------|---------------|---------------------|
| 1. 'Queen Elizabeth'.....     | Medium Pink   | All-America in 1955 |
| 2. 'Montezuma'.....           | Orange-Red    |                     |
| 3. 'Carrousel'.....           | Dark Red      |                     |
| 4. 'Starfire'.....            | Currant-Red   | All-America in 1959 |
| 5. 'Roundelay'.....           | Dark Red      |                     |
| 6. 'El Capitan'.....          | Medium Red    |                     |
| 7. 'Pink Parfait'.....        | Pink Blend    | All-America in 1961 |
| 8. 'Golden Girl'.....         | Medium Yellow |                     |
| 9. 'John S. Armstrong'.....   | Dark Red      | All-America in 1962 |
| 10. 'Mt. Shasta'.....         | White         |                     |
| 11. 'Merry Widow'.....        | Dark Red      |                     |
| 12. 'Governor Rosellini'..... | Medium Red    |                     |

Floribundas are low growing roses on which the blooms are in clusters and are used effectively in borders or hedges or where a mass planting is desired.

Floribundas recommended include:

- |                           |                        |                     |
|---------------------------|------------------------|---------------------|
| 1. 'Fashion'.....         | Pink Blend             | All-America in 1950 |
| 2. 'Spartan'.....         | Orange-Red             |                     |
| 3. 'Frensham'.....        | Dark Red               |                     |
| 4. 'Vogue'.....           | Pink Blend             | All-America in 1952 |
| 5. 'Red Pinocchio'.....   | Dark Red               |                     |
| 6. 'Eutin'.....           | Dark Red               |                     |
| 7. 'Ivory Fashion'.....   | White                  | All-America in 1959 |
| 8. 'Floradora'.....       | Salmon-Rose            | All-America in 1945 |
| 9. 'Saratoga'.....        | White                  | All-America in 1964 |
| 10. 'Betty Prior'.....    | Medium Pink (5 petals) |                     |
| 11. 'Elsie Poulsen'.....  | Medium Pink            |                     |
| 12. 'Jiminy Cricket'..... | Orange Blend           | All-America in 1955 |
| 13. 'Circus'.....         | Yellow Blend           | All-America in 1956 |
| 14. 'Little Darling'..... | Yellow Blend           |                     |
| 15. 'Independence'.....   | Orange-Red             |                     |
| 16. 'Permanent Wave'..... | Medium Red             |                     |
| 17. 'Fusilier'.....       | Orange-Red             | All-America in 1958 |
| 18. 'Ma Perkins'.....     | Coral-Pink             | All-America in 1953 |
| 19. 'Sarabande'.....      | Orange-Red             | All-America in 1960 |
| 20. 'Cocorico'.....       | Orange-Red             |                     |

Two roses were selected as having the necessary qualifications for All-Americas for 1963. Both are hybrid teas. The first one is 'Royal Highness' which is a large shell-pink rose with high-centered blooms on long stems. This rose is a cross of 'Peace' and 'Virgo' and has many of the characteristics of 'Peace'.

The second rose selected for 1963 is 'Tropicana'. This beautiful and

outstanding fluorescent, orange-red hybrid tea is recommended as a *must* rose for all Colorado gardens. It ranges from 3½ to 4 feet tall and is a vigorous, compact bush with fine, dark green foliage. It has many good sized blooms which are borne on sturdy stems and which do not fade. The blooms, whether on the plant or cut for the house, last from six to eight days. It is a very disease resistant rose

and in the Denver Botanic Gardens where it was surrounded by roses covered with mildew it came through without being affected. This rose seems to have everything a good rose should have.

For 1964 two roses were selected as All-Americas. The first is 'Granada', a truly beautiful, multicolored orange and red blend hybrid tea. This large, vigorous plant with its fragrant, high-centered blooms and its deep green, semi-glossy foliage is highly recommended for this region.

The second 1964 All-America Selection is 'Saratoga', a pure white floribunda, gardenia-like in appearance, which has long stems ideal for use in bud vases. The plant is 2 to 3 feet in height and has glossy, green foliage. Although this rose is rated by many as excellent, it is not thought to be as satisfactory as 'Ivory Fashion' which is still considered the top white floribunda rose for this area.

The two All-America Selections for 1965 are 'Mister Lincoln', a deep red hybrid tea and 'Camelot', a coral-pink grandiflora. Both of these roses were created by Swim and Weeks of California and are considered satisfactory.

The 1966 All-America Selections have recently been made and are:

- 'Matterhorn' . . . . . White hybrid tea
- 'American Heritage' . . . . . Yellow hybrid tea
- 'Apricot Nectar' . . . . . Apricot floribunda

Three of the new roses introduced in 1964 and tested with favorable results are:

'Oklahoma', a beautiful, dark red hybrid tea which opens rather flat and has good fragrance. This rose was created by Swim and Weeks from 'Chrysler Imperial' and 'Charles Mallerin' and gives indications of being a first class rose.

The second rose is a German introduction: 'Lottie Gunthart', a hybrid tea,

ruby red in color. This rose has lots of petals, somewhat resembles a peony and actually is huge in size.

The third rose is a very dainty yellow floribunda named 'Small Talk'. This rose is about 15 to 18 inches tall and makes an excellent border or edging plant. It has small glossy leaves and actually is a very attractive plant.

Although many new climbing roses have been introduced in recent years, most of them do not seem to have the hardiness to withstand one of our really tough Colorado winters.

The three most popular climbers for this region still appear to be:

1. 'Improved Blaze' . . . . . Medium Red
2. 'New Dawn' . . . . . Light Pink
3. 'Paul Scarlet' . . . . . Medium Red

The first two are everblooming and normally bloom three times each season, whereas 'Paul Scarlet' is limited to one burst of blooms in the early summer.

Other climbers that give promise of being able to withstand a moderate Colorado winter include; 'Spartan', an orange-red; 'Don Juan', a dark red pillar; 'Gladiator', a medium red; 'Doubloon', a medium yellow; and 'High Noon', a dark yellow. Although 'Golden Showers' was an All-America Selection as a climber in 1957, it has not shown much promise in this region. It actually is a pillar rose and tends to freeze back each winter. However, it has lots of vitality and comes back each season producing one good crop of blooms.

Regarding all classes of roses in general, the advice to the novice rose grower is to purchase the older recommended varieties and have fewer disappointments. However, for the past three years 'Tropicana' has been grown in our area with good success and it undoubtedly will give satisfaction.



**'TROPICANA'**

Courtesy All-America Rose Selections

# Landscaping With Roses

Not many years ago it was fashionable to locate a rose garden away from the house behind some large shrubs or trees because of the old idea that roses are not very attractive part of the year. Recently, however, probably because of the creation of beautiful new hybrid tea, floribunda and grandiflora roses, there has been a decided trend to use more roses in front and along side a house where they effectively carry out a good landscape plan.

Observations indicate that all colors of roses — red, pink, yellow and white — can usually be used to advantage. A one color planting of floribunda or grandiflora roses in front of a house, is often spectacularly beautiful, providing the color of the roses harmonizes with the color of the house.

Most people seem to prefer red roses and as a result, they appear in many layouts with junipers. The deep red hybrid teas 'Crimson Glory' or 'Chrysler Imperial' or the floribundas 'Red Pinocchio' or 'Frensham' are possible choices, although there are many others equally beautiful.

Roses are probably the most popular of all garden plants because they lend themselves so well to either formal or informal gardens. In planning and laying out a rose garden, first consider the available space and the number of bushes to be planted, then decide whether a formal or informal garden is desired.

Most formal gardens are more or less symmetrical and usually center around a statue, pool, birdbath, sundial or some other decorative object. Many include circular or oval beds in com-

ination with rectangular ones. These layouts are often quite elaborate. Ordinarily found in parks, public gardens or large estates these patterns are sometimes rather difficult to adapt to a small private yard so, as a result, small gardens usually tend more toward informality.

Because of the differences in size, shape and topography of small to medium-sized yards, there can be no set design or pattern in planning and constructing an informal rose garden. Here, then, are many opportunities for a homeowner to exercise initiative and vision. Square or rectangular beds are usually found in areas bounded by straight lines, such as buildings, fences, patios, walks and driveways. If the bed is on a slope, it must conform to the contours of the ground in order to be properly irrigated and to provide satisfactory drainage. Rose beds built on ground sloping to the east and south are usually blessed with better sunlight conditions.

Conditions vary with every home plot, so actually there is no limit to the designs that can be satisfactorily worked out. If possible, locate rose beds so that they can be enjoyed from the patio or porch or from a window or two in the house.

Many people consider a rose garden as the focal point of their outdoor living room to be enjoyed by family and guests.

Maintenance is always a problem. Hence it helps to have more or less rectangular beds planted two to three rows wide with bushes staggered and spaced from 18 to 24 inches apart.

Should two or more beds be located side by side in a lawn, leave at least 30 inches between the beds to facilitate grass cutting. Many people use metal edging strips to keep borders neat and to prevent grass from creeping into the bed. In setting the metal strips, place them low enough to permit the mower to run over them. To facilitate maintenance work, it is recommended that the beds be built about 4 feet wide for two rows of roses and about 6 feet wide for three rows.

For a front yard planting, the lower growing floribundas, with their prolific number of blooms and riot of color, are good in hedges or borders on both sides of a walk leading to the front door or along a driveway to the garage.

If rose beds are located along a fence or wall or adjacent to a building, plant tall growing varieties in the rear. If the bed is round, oval or rectangular, tall growing varieties should be planted in the center of the bed with lower growing bushes around the edge. In this way, blooms are displayed to better advantage and each plant will receive its share of sunlight.

If possible, locate beds where they will be protected from prevailing winds for heavy winds are disturbing to roses and full blown roses shatter rather easily. A row of trees or shrubs or a nearby fence or wall may offer suitable shelter. To facilitate spraying and other maintenance problems, plant roses in groups or beds, located away from the roots of most trees and other competing plants which would draw on their food and moisture. Most trees, because of their spreading roots, cause difficulties — willows, maples and elms are particularly bad. Ornamental trees such as flowering crab apple, hawthorn, mountain ash and purple-leaf plum are less troublesome. The roots of most evergreens, especially Pfitzer

and upright junipers, do not spread very far and roses may be safely planted close to them. As previously mentioned, these small evergreens make an ideal background for roses.

Another help in combating root competition is foliar feeding — that is, spraying the foliage of a plant with liquid plant food.

If roses must be planted under or near trees and large shrubs, a barrier of sheet metal sunk vertically in the ground at the edge of the rose bed often cures or helps the situation. Some people have good results by using a sharp spade several times a year along the edge of rose beds and in this way cut off any encroaching roots.

When roses are planted close to a fish pool be extremely careful in spraying for many sprays are deadly to fish.

A rose garden should get at least six hours of sunshine, preferably morning sun and have reasonably good drainage. The success of a good rose garden depends upon proper preparation of the soil prior to planting. Often this is neglected and in later years a great deal of time must be spent to correct it.

Climbing roses are appropriate in any landscape plan where they are trained on a fence, building, arbor, gateway or separate trellis. Climbers provide an ideal solution to the problem of screening out unsightly objects in the adjacent areas, reducing traffic noises and furnishing privacy to a back porch or patio.

The largest and toughest roses are the old-fashioned shrub roses. These are effective in hedges to provide a fence or screen or a garden background. The most popular of these in Colorado are 'Harrison's Yellow', 'Austrian Copper', 'Grootendorst', 'Rugosa' or 'Hugonis'. Although they are hardy, they are usually limited to one burst of bloom each season.



# The Exhibiting of Roses

The object of a rose show is to encourage people to grow more and better roses, to gain ideas from their competitors and to hear and learn about the newer varieties.

Before getting very far into the subject, it would be well to point out that no special skill is required to grow first class roses, other than following good and sound cultural practices. To produce fine exhibition flowers it is necessary that well established roses be fed with recommended fertilizers, about once a month. The feeding with liquid organic fish food, foliar fertilizers or cow manure, between regular fertilizer feedings, will materially assist in producing first class exhibition blooms. One thing is certain, careful preparation of the soil in the rose bed makes for better and more abundant blooms.

In many of the rose shows the novice or beginner often wins many of the coveted ribbons and trophies. Should plans be made to enter roses in a show it would be well to anticipate the entry

two or three weeks in advance. Assuming the roses have been properly planted, cultivated, fertilized and sprayed or dusted for insects and disease the most important detail is to see that they get plenty of water prior to the show.

The greatest asset a person can have when exhibiting roses is plenty of refrigerator space for storage, which permits him to start cutting and storing blooms about a week before the show. In storing roses, the refrigerator should be maintained at a temperature of 36 to 38 degrees.

It makes no appreciable difference whether the blooms are cut early in the morning or in the evening after the heat of the day has passed, providing the blooms are in good condition when cut and are plunged immediately up to their necks in cold water. (Some people recommend warm water.) Generally, the blooms should be cut when a quarter to a third open or when one to two petals have started to unfurl. To facilitate identification,

**'PINK PARFAIT'**

Arrangement by Helen Corson. Courtesy Armstrong Nurseries



put a tag on each bloom when cut. Some difficulty will be experienced in storing red roses for a week, as they often have a tendency, after about three days in storage, to darken or blue on the edges. Experience is the best guide in the timing of the cutting and storage of the various varieties of roses. However, there is not much question that roses that have been chilled and hardened properly stand up much better in a show than freshly cut roses. Many exhibitors use a bloom preservative such as Roselife, Petalife or Floralife to lengthen the life of roses.

The stems should be from 12 to 18 inches in length or in pleasing proportion to the size of the bloom. They should have at least three or more sets of leaves and all spray or foreign material should be removed. Perfect leaves add to the appearance and improve the rating. The stems should be straight and capable of supporting the rose in an upright position. Be sure there are no aphids or other insects on the flower or leaves.

One-gallon Prestone cans, with the tops cut out, make very satisfactory receptacles for the storage of roses in the refrigerator. Some people use plastic bags for storage.

Many methods are used in transporting roses to the show room. Some use individual soda bottles, some pails of cold water and some heavy paper or plastic containers. Heavy cardboard boxes, like those Christmas fruit is shipped in are also satisfactory. These boxes are about 12 inches wide, 18 inches long and 4 inches deep. Six to eight roses are laid the long way of the box and the same number in the opposite direction. Crushed ice or ice cubes are placed on the stems and foliage in the center to keep the roses cool.

At the time of judging, the rose

should be from one-half to three-quarters open, with the petals being symmetrical around the center. High-centered blooms have an advantage over those that are not so fortunately endowed. The careful removal of a few outside petals which have been torn or damaged is permissible, if well performed and will probably improve the appearance of the entry. Be sure the petal removal does not leave a stub and does not throw the bloom off balance.

If the bloom is too tight, blowing directly into the center may assist in opening it up. Just prior to placing the bloom in the exhibition vase cut off about  $\frac{1}{2}$  inch of stem.

For those who are not familiar with American Rose Society national ratings, it might be well to point out that a rose with a rating of 10 would be considered a perfect rose. Incidentally, 'Peace' with a rating of 9.6 and 'Crimson Glory' with 9.1 are the two top hybrid teas in America.

Roses with ratings of 9 or over are considered outstanding, from 8.0 to 8.9 excellent, 7.0 to 7.9 good, 6.0 to 6.9 fair and 5.0 to 5.9 are questionable. A rose with a rating below 5 is poor and would not be classed as a good buy.

In order to judge and rate roses satisfactorily it is necessary to have a standard measuring device. Without some standard it would be possible for a judge to express his or her individual preference for perfection in such items as size, form, length of stem or other feature, in a manner out of proportion to the other elements of the rose to be judged.

To serve as a guide and avoid as much confusion as possible the American Rose Society has set up the following point system for the several ele-

'IVORY FASHION' ARRANGEMENT

Picture Courtesy Jackson & Perkins Company



ments on which it is believed a rose should be judged and rated.

1. Form .....25%
2. Color .....25%
3. Substance .....20%
4. Stems & Foliage .....20%
5. Size .....10%

A brief description of each of those elements might be desirable.

1. **FORM 25%**. Defined as the shape or external appearance of the flower. The beauty and attractiveness of a flower begins with its form. A flower may be as large as a peony but if it lacks symmetry or is out of proportion to stem and foliage it is not considered high scoring.

The American Rose Society recognizes five distinct types of bud form:

- (a) The slender or tapering bud, as 'Eclipse' or 'First Love'.
- (b) The pointed bud, as 'Charlotte Armstrong' or 'Sutter's Gold'.
- (c) The ovoid bud, as 'Peace' or 'The Doctor'.
- (d) The globular or cup-shaped bud, as 'Radiance'.
- (e) The urn-shaped bud, as 'Crimson Glory', 'Talisman' & 'Eiffel Tower'.

2. **COLOR 25%**. Is the flower dull or bright with no blemishes on the individual petals? The color of some varieties often varies with the soil, fertilizing or weather conditions. Red roses should be free of a bluish tinge.

3. **SUBSTANCE 20%**. This term usually needs an explanation. Authorities appear to agree that a flower with good substance or body has firm, thick, tough petals that do not bruise easily and the flower has good keeping qualities.

4. **STEMS & FOLIAGE 20%**. The stems should be in pleasing proportion to the size of the blooms, normally

Rose: 'GOLDEN RAPTURE'  
Arrangement by Mrs. Ray Turnure  
Picture by Mr. Ray Turnure



from 12 to 18 inches in length and should be reasonably straight and of a size to satisfactorily support the bloom.

5. **SIZE 10%**. Many amateurs judge flowers by their size. However,

Arrangement by Mrs. Ray Turnure and the late Mrs. Henry Conrad.  
Roses: 'FIRST LOVE' and 'DR. DEBAT'

Picture by Mr. Ray Turnure



size seems to be the least important of the elements judged, as the average flower which meets the above requirements and is in good condition will be rated the full 10 points. Should the judging be very close, it can normally be expected that the larger bloom will receive a slightly higher rating.

**GENERAL.** Bear in mind that the flowers are judged at the time the judge sees them, not how they previously looked or how they will look later when they open up a little more. To have the flower in top condition at the time of judging is a question of timing based on experience.

Be sure roses are correctly named and entered in the right class, in accordance with the rose show schedule.

Although the rose show schedule is drawn up to meet local conditions it conforms more or less to the following pattern:

(a) About 50 or more special classes of both single specimens and groups of three of the most popular hybrid teas, floribundas, grandifloras and climbers.

(b) About 50 color classes of both single specimens and groups of three blooms of hybrid teas or blooms or sprays of floribundas and grandifloras.

(c) About 15 to 20 classes of arrangements. The older rose schedules included such classes as an arrangement for a coffee table, buffet or mantle. The more recent schedules have got a little more advanced, elegant and refined and usually follow a main theme with the result we have classes such as "Green Sentinels", an arrangement using pine or spruce with roses, or "Gold Rush Days" an arrangement in which yellow roses predominate.

The exhibiting of roses is a good clean sport and win or lose the participant will meet many fine and friendly

people. Just keep in mind that most judges have been or still are outstanding exhibitors who have had special training in the judging of roses. It will also be discovered that some judges are high scorers, while others are more conservative. The more experienced the judges, the better the results.

Although the participant will never be able to quite understand why certain of his roses, which he thought were sure winners did not receive a cup or at least a blue ribbon, he will, on the other hand be surprised every once in a while to find a blue ribbon tagged on a bloom that he did not think was outstanding but which suddenly opened up into a beautiful creation.

**Sterling Bowl Tournament — First Place  
Arrangement by Mrs. John W. Minton  
of W. Roswell, New Mexico.  
Roses: 'GOLDEN CHALICE', 'CHALICE'  
and 'MOJAVE'.**

Picture courtesy of Jackson & Perkins Company, 1960





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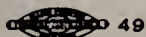
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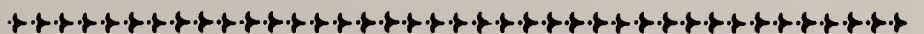
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## THE COVER

ERIOGONUM UMBELLATUM  
Sulphur Flower

Photograph from Water Color  
by Emma A. Ervin



# Beautiful Colors with Natural Dyes

MARY WILKINSON

Natural color dyeing of wool yarn is a fascinating hobby which becomes most intriguing to any novice interested in the clear, beautiful colors to be achieved in the process. Natural dyestuffs, while largely obtained from vegetable material, may also have an animal or mineral origin. Although it might seem that there would be little of nature's materials to work with in the winter, there are so many dyestuffs available all year that the possibilities are almost inexhaustible.

Of course, it is fun to use fresh things from the garden: coreopsis, lily-of-the-valley, zinnia, dahlia and ragweed are wonderful but in the dead of winter it is great fun to achieve vivid colors from onion skin, indigo, cochineal and other media. There are several dye houses which carry a complete supply of the common natural dyestuffs as well as dyes used in ancient times. These suppliers are listed later in this article.

Don't be hesitant about dyeing wool because it involves simmering since the dyed yarns remain as soft and attractive as they were originally. Using the correct method as described further on insures perfect results. There is no doubt that vegetable dyes produce colors with more depth and life than ordinary commercial dyes. There is something about naturally dyed yarn that seems to catch more light and the colors blend together without clashing. This is probably why there is such a revival of interest in this process.

For some background on the origin of natural dyes it is interesting to know that cochineal, for instance, is made from the dried bodies of the insect, *Coccus cacti*, from Mexico and Central America; kermes, an ancient dye, sometimes still available, is from the insect, *Coccus ilicis*. Both give various brilliant red shades.

Different parts of plants are used for dyeing: the dried outer skin of the

yellow onion, which is discarded by the grocer, provides a very potent dye; coreopsis blossoms are also potent, fresh or dried; there are other flower blooms which are usable, such as yellow dahlias. Some plants yield dye only from the leaves: sumac, privet, lily-of-the-valley, Lombardy poplar, etc. Many barks, roots, berries and fruits can be used. From some plants, such as marigold, good, strong dye is produced in the same color whether the bloom only or the entire plant is used.

Using the simplest kitchen equipment and any of the plant materials mentioned, a wonderful range of colors may be achieved. Some equipment is mandatory: enamel kettles (aluminum, brass, copper or iron will affect colors; after gaining experience in dyeing they may be used for that reason but not at first); postage scales, for weighing in ounces; (a pound of yarn may also be weighed on these by putting it on a paper plate) and a long-handled wooden spoon for stirring and removing yarn from solution.

Most fibers can be dyed but the recipes vary and these procedures are for wool only. There are three steps to follow in natural dyeing and, while each is simple, they must be followed carefully: washing, mordanting and dyeing.

Most wool yarn is scoured, which means that all the natural oils are removed in the cleaning process; oil is then replaced for the spinning process. This oil must be removed so the yarn should be carefully washed with mild soapy water and rinsed completely.

To mordant yarn is to penetrate the fibers with a material which opens its pores and allows the dye to penetrate completely. In some cases the mordant is necessary to make the dye fast. There are many mordants but there are two which are most common because they are simple to use and give a greater range of color. One is alum and cream of tartar; the other is chrome (potassium dichromate) which is available at the pharmacy; the latter should be used with caution as it is poisonous and utensils must be thoroughly washed after use.

Dye recipes always apply to 1 pound of dry yarn; this must be tied in skeins, preferably not over 4 ounces each. It is fun to use small skeins for they may be removed from the dye bath individually, resulting in many shades of each color.

To dye a pound of wool yarn with a common medium, such as onion skins, put several handfuls of the skins in a big kettle of water to boil; when the yellow colors the water, the dye vat is

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ready. Separate the pound of yarn into 4 skeins and tie them loosely in three or four places so that the yarn doesn't tangle. If the skeins are tied tightly some may not be dyed as deeply as others.

Wash the yarn and rinse thoroughly. Dissolve 4 ounces of alum and 1 ounce of cream of tartar in 4 gallons of water in an enamel kettle. Put the wet yarn in and bring almost to boiling; simmer but do not boil for about an hour, stirring once or twice. Rinse yarn and it is ready to be dyed.

There is one cardinal rule which governs wool dyeing: never change the temperature of the solution too suddenly. If this happens, the wool will felt or mat and be ruined. The solution should always be heated or cooled gradually; thus, the yarn will not be harmed by cooking. This is simpler to control than it may appear. The yarn can be cooled for handling by running cooler water gradually into hot water or heated by running warm or hot water into cooler water. The clean wet yarn heated gradually by the above method should be placed in the onion skin solution—all four skeins at once. (The recipes say to strain the dye bath first but it is not necessary). Stir and simmer for a little while; this is potent dye and the yarn will turn yellow almost at once. Lift a skein occasionally and when an appealing shade is reached, remove two skeins; allow the other two skeins to simmer until they are quite a dark gold shade; remove and cool them. Now put one light and one dark skein aside for rinsing; they are finished. If a variety of colors is desired, add a teaspoon or less of iron (ferrous sulfate) to the dyebath and stir well. Now immerse the other two skeins, one light and one dark, and simmer until there is one good light

green and one darker green skein. Remove, rinse and the job is done. There is a light yellow, a dark gold, a light green and a dark green skein all from one mordant and one kettle of onion skins. The variety of colors to be obtained is almost endless; every dye plant will give many shades and, by using different mordants, the color range can be varied.

As an example of this, dye another pound of wool with onions, using chrome as a mordant; dissolve  $\frac{1}{2}$  ounce of chrome in 4 gallons of water and proceed just as with the alum. Using onion skins again, varying shades of orange will be obtained, the deepest being a good, dark burnt-orange; save out a light and dark skein and use the other two with iron as you did before; a golden brown and a rich, dark brown will be achieved. Again, four different shades have been obtained from one dye.

Any gardener interested in natural dyeing will want to start a garden of dye plants for personal use. The list of domestic plants used is almost endless and selections will, of course, depend on what is hardy in the area. Here are a few that are successful in Colorado:

Ladies' bedstraw, *Galium verum*: This is a common dye plant in England and is hardy here; it is a member of the madder family (Rubiaceae) and supplies red color from the roots and yellow color from the flowers.

Rabbitbrush: This plant is native to Colorado and produces the best bright yellow of any plant I have used. The yellow blooms appear early in the fall. It is widely used by the Navajo Indians for yellows in their rugs.

*Dahlia*: The yellow blooms produce wonderful colors, particularly the ones that have deeper color in the center.

Oranges ranging from very light to very bright and dark may be obtained with both mordants. This is a potent dye.

*Coreopsis* (*Coreopsis tinctoria*): This is often called the dye-plant; it is most potent and, if not strained out of the dye bath, it must be stirred continually or spots will be found in the yarn where petals lodged. The blooms give a range of colors and may be used fresh or dried for winter use.

Western ragweed (*Ambrosia psilostachya*): This is only one of the ragweeds which give a good green when used with alum mordant; it seems to give more color when cut young and the whole plant may be cut up and used.

The list goes on into the hundreds; every book written on the subject will reveal a few more. Shrubs, tree bark, roots, lichens—as well as many berries and a few fruits may be used.

The books vary greatly and the texts seldom agree but each will provide something of value. Personal experimentation will be most enlightening and rewarding. The one book which seems to be the most accurate and well presented, with the most interesting material on natural dyeing, from history to recipes, is a booklet published by Brooklyn Botanic Gardens: *Dye Plants and Dyeing*—a handbook; \$1.25. It contains very good color photographs of many of the colors and their sources. It is available from Brooklyn Botanic Gardens, 1000 Washington Ave., N.Y.,

N.Y. or from the Gift Shop located at Botanic Gardens House, 909 York St., Denver, Colorado.

Catalogs and price lists are available from the following dye supply houses:

Skilbeck Brothers Ltd.  
Bagnall House  
55-57 Glengall Road  
London, S.E. 15, England

Dominion Herb Distributors, Inc.  
5341 Western Avenue  
Montreal 28, Quebec, Canada

The latter firm lists hundreds of vegetable dyes in every form from leaves, roots, bark, seeds and flowers to ferns, grasses, dried berries, etc. The British firm lists the old standbys from earlier days to the modern mordants.

---

Ed. Note — For many years Mary Wilkinson, weaving enthusiast, sought hand-spun woolen yarn in the Four Corners area. Acutely aware of the shortage of pleasing colors available commercially to Navajo weavers there, she encouraged them to dye their own yarns to enhance the value of their rugs.

Under the auspices of the Navajo Tribal Council, demonstrations by qualified instructors have been given in central locations on the reservation. Mrs. Wilkinson, however, was anxious to help a small group of weavers in the heretofore remote Tec Nos Pos trading area. In learning of this paradoxical situation in which a Caucasian was invited to share with Navajo craftsmen her knowledge of using native plants for yarn dyeing, *The Green Thumb* asked Mrs. Wilkinson to prepare the above article, briefly describing her methods.

Samples of her success in dyeing yarns are on display at Botanic Gardens House.

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# Taxa of Hosta

## AS I KNOW AND GROW THEM

AVALONNE J. KOSANKE

WITH ALL THE lavish sweeps of quick color available to the gardener of today, why should *anyone* want to grow *Hosta*? They offer nothing spectacular as flowers go. They retire shyly to the background. They take years to get established. Moreover, any but the most common varieties are difficult to obtain. So . . . why bother? Perhaps this little verse will help:

So plant petunias for today . . .

Their passing brings no sorrow  
If one were wise enough to plant  
The *Hosta* for tomorrow.

Festive colors come and go in the garden and not many plants remain attractive after their day in the spotlight is over. The *Hosta*, however, look more luxuriant every day of the growing season till frost cuts them down.

Nothing flashy in the flower line? Well, maybe. *Hosta plantaginea* puts out a rather spectacular white flower that's nothing to sniff at. The color range moves from the delicate pink-lavendar of *H. sieboldiana* to the rich,

deep violet of *H. fortunei* var. *hyacinthina* and the saucy grape-tinged stripes on *H. decorata*. Their stalks may rise 10 inches in *H. tardiflora* or more than 40 inches in *H. ventricosa*. All may be used as cut flowers.

Retire to the background? Only sometimes. More likely you just haven't seen a well-grown clump of *Hosta crispula* sweeping the ground in a 5-foot circle. She is as retiring as a grand duchess about to make an entry! Each white-trimmed leaf arches crisply into place to complete the bold, geometric pattern. And no one walks past the crisp, blue seersucker leaves of *H. sieboldiana* without a second look. No, not all *Hosta* retire to the background.

Years to get established? True. These are definitely not a plant-in-a-hurry for people who want beauty to bloom overnight. Most *Hosta* demand a year to settle into a new home and some require five or six years to store up enough energy to produce full-sized



FIGURE 1.

A Variety of *Hosta fortunei* (young plant)

leaves true to variety. Once they feel secure, the show begins. From then on till long after their planter has retired, they will build their orderly mounds, for the *Hosta* rate second only to the choicest evergreens in permanent plantings. They speak of stability and contained luxury. They stand as signal clumps to mark an important area or stretch in trimly uniform, weed-proof bands along the garden walk.

Thriving in shade, the *Hosta* turn a light-skimped area into leaf-packed orderliness. A few will even tolerate sun without their broad leaves burning. We will have areas of half-hearted sunlight which the *Hosta* will fill admirably. They thrive on neglect, ignore bugs and crowd out weeds. They may remain neat, retiring foundation plants or become bold accents in the landscape. They make a path more invit-

ing, a rock garden more exciting. They cool a patio or complement a pool. And they almost never overstep their boundaries. Well-organized gardeners employ them to cover fading spring flowers like tulips, daffodils and bluebells. While they crave a rich soil with good drainage to properly support their luxuriant foliage, the *Hosta* will tolerate less ideal conditions and still put on a good show.

If slugs find them tasty, curb their unappreciated appetites by scattering a handful of snail slug pellets around each crown several times early in the season. An occasional bloom stalk will suddenly come alive with aphids if the season spawns them in excess. Any good aphid spray used according to directions will dispose of them. I know of no other pests to spoil your pleasure in them. Some growers mulch their *Hosta* in summer to slow down evaporation and cool the soil. I don't but it can't hurt and might help. Once established, one deep watering a week suffices. A stingy hand with the fertilizer, please. Members of this genus prefer to support themselves from all that humus you worked into the soil prior to planting them. For best continued performance, don't omit that refresher of rich compost worked in lightly around the crown in early spring. Possibly a little well-aged manure can be applied *if* it doesn't touch the plant.

It is interesting to note these perennials are native to parts of eastern Asia, especially Japan and China. There are no close allies in North America, which partly answers that "hard to obtain" complaint. Until recently, all our varieties and species have come to us through European sources. There they have been known since the German physician, Englebert Kaempfer, sketched two *Hosta* species

during his visit to Japan in 1690-1692. The tangled botanical record of the genus *Hosta* began nearly a century later when a pupil of Linnaeus, Karl Peter Thunberg, travelled to Japan and in 1780 published a plant as *Aletris japonica*. There followed a series of changes during which it was known variously as *Hemerocallis*, *Hosta*, *Niobe*, *Bryocles*, *Aletris*, *Joksan*, *Funkia*, and, more commonly, the plantain-lily, corfu-lily or August-lily. The name *Hosta* was one proposed by Trattinnick in 1812 and this is the one now accepted for general use. However, one is apt to find suppliers still using one or more of these other names when referring to *Hosta*.

Almost everyone has seen and smelled the *Hosta plantaginea* or its variant *H. plantaginea* var. *grandiflora* (listed under *H. subcordata grandiflora*). This species stands alone in the subgenus *Niobe*, for alone of all the *Hosta*, this one bears slightly ascending, large, pure white flowers crowded into an almost capitate raceme. Filaments in their lower part joined to the perianth. Its fragrance permeates the entire garden. The large, cordate leaves are very glossy and almost yellow-green. One of the first two *Hosta* introduced to Europe, it was described by Lamarck in 1789. It is still a patriarch among permanent plantings, often growing for generations if not disturbed.

All other *Hosta* are contained in the subgenus *Gibosi* and have the general description of flowers with single bracts, more or less pendulous, scentless, perianth more or less violet, filaments free from the perianth.

I am particularly fond of the white edged *Hosta* and several are listed with many growers. The hardiest of these is *H. albomarginata* (also sold as *H. lancifolia* var. *albo-marginata*). Its thin, narrow, elliptic-lanceolate leaves

are 8 to 12 inches long and the white border feathers into the bright green center and trails down the wings of the petiole. Midsummer its bloomstalks rise well above the leaves to show off purple-striped mauve flowers. Its ability to multiply rapidly on soboles (shoots from the ground) makes this species ideal for filling in areas but under some conditions might also make it a pest. This appears to be the only species with this type of propagation.

A very similar form sold as *Hosta alba marginata* has no runners, thus multiplies less rapidly. It is definitely a favorite in my garden for long border work. Not immediately recognized as a variant of this species is one designated as *H. albomarginata* var. *alba*, in which the leaves are a pure, bright green and the flowers appear to be white when fresh. In drying, they become a pale bluish-violet. Its leaves are a trifle narrower and the plant is slower in growth, possibly from a lack of anthocyanins. Its neat, compact form (about 6 inches) and dwarf size make it ideal as a subject for rock gardens. When established, it blooms pro-

lifically on 12-inch stems which are ideal for cutting.

The landscape value of the largest member, *Hosta crispula* (sold as *H. fortunei albo-marginata*) was mentioned earlier. Mid-July finds pale lavender, funnel-shaped flowers lifted on 3-foot stems. The 9-inch wide leaves are undulate with long, twisting tips. The clean, white border averages half an inch in width. While it prefers shade, this species will tolerate more sun than most *Hosta*. This quality makes it a favorite cemetery plant in Sweden.

The small lot landscaper may well prefer the tailored green leaves of *Hosta decorata* (commonly sold as 'Thos. Hogg'). The extremely narrow white border marks crisp, broad leaves noted for their blunt tips. The mounds are neat, about 12 inches high and ideal for edging paths. This August

#### ERRATE

The following errors were made in the July-August issue of *The Green Thumb*. In the article entitled City Park, page 124, Mr. Reinhardt Schutze's name was misspelled. In the same article, page 124, the Old Cronies Club was erroneously referred to as the Old Crony Club.

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FIGURE 2.

*Hosta sieboldiana aureus marginata* (young plant)

bloomer sends up 2-foot stems on which the flower's recurved perianth is a striated dark violet.

A newcomer to this group is *Hosta lancifolia* hybrid #537. I have not yet seen it bloom and cannot state how much sun it will tolerate but it will surely delight the rock garden fan. The tidy, 12-inch tufts are formed by deep green leaves, each less than 2 inches wide, pertly edged in white. It should bloom mid-summer on stalks held well above the leaves, the flowers being purple-striped mauve.

Too often we overlook a plant sim-

ply because it is commonly grown. For extensive border work, as along a winding drive, where a wide variety of sun and soil conditions exist, nothing surpasses *Hosta lancifolia* (sold as *H. japonica fortis*). Known in Europe since 1831, this vigorous old timer forms a pleasingly uniform band. The tufts of firm, narrow leaves are deep, glossy green. Late in summer, it flaunts dark violet-mauve flowers on numerous, slender, firm yet flexible stems. This species withstands weather extremes, drouth conditions, poor soil and small boys chasing dogs. Of course

it will reward \*T.L.C. with a richer display of flowers, form and color.

(\*Editor's Note: T.L.C., Tender Loving Care.)

A close relative, but standing at the opposite end of the scale in hardiness, is *Hosta tardiflora* (sold under various names, including *H. sparsa*, which is actually a different species. Its leaves are shorter, firmer and darker in color than those of *H. lancifolia* and its petiole is never winged. The October to November flowering season marks it as our latest flowering *Hosta*, likely too late to be enjoyed in our area. The pale purple flowers are funnel-shaped, slightly recurved and numerous to the point of crowding on the 15-inch stems. *Hosta sparsa*, the clonal variant mentioned earlier, is very hard to come by — one of those “wait your turn to get it” varieties. It approximates *H. tardiflora* in its habits except that *H. sparsa* never sets fruit.

I am also intrigued by the reverse color pattern of white centers and green edges. These are the arranger's delight and the landscaper's darlings. *Hosta undulata* leads off with rather small, narrowly ovate, strongly undulate leaves having about ten pairs of lateral veins. The margin is a pure, clean green. This species flashes the widest area of white in proportion to its blade surface. The whiteness continues down the groove of the distinctly winged petiole. My particular planting of this species seems to vary from the strict rules by sometimes sporting a flash of

green in the white field. In fact, mine tends to become quite spotted with green as the season moves on, possibly due to too much sun. If a plant is vigorous, however, there will always be enough fresh white leaves for the flower arranger's use. This rates as one of my choicest of all *Hosta* — and one of the touchiest. Obviously it resented its move to Colorado or to the spot chosen for it and it sits there sulking, increasing neither in leaf size nor number of shoots.

*Hosta undulata* var. *univittata* is far more vigorous, larger in leaf, more generous in clump. No gardener should overlook its special qualities. The waxy, rich green edge sharply defines the white flash, which is much smaller than in the species. The leaf always looks crisp and ends in a sudden, joyous twist. Again the petiole is noticeably winged. This variety undergoes no color change during the summer, which definitely increases its value. The species bloom in August, its variant in July and in both the fruit is abortive.

Still another member of this species may not be recognized by the layman. It is *Hosta undulata* var. *errumena* (sold variously as *H. errumena*, *H. lancifolia* var. *fortis*, and *H. viridis*). This is a robust, markedly uniform plant with dark, green leaves. It forms a magnificent clump and is often featured to enhance a focal point in the garden. The nearly-flat blades are 8 to 10 inches long with prominent, curved veins. Pale lilac flowers appear in July on stems up to 40 inches.

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The bluest flowers of all belong to the second of the original pair of *Hosta* cultivated in Europe. This is *H. ventricosa* (listed as *H. coerulea*). In 1797, it was recorded as *Hemerocallis coerulea* by Andrews. It is still one of the most decorative species of the genus *Hosta*, being handsome in both leaf and flower. Only *H. plantaginea* (its partner in early history) has larger blooms. In July and August, *H. centricosa* sends up thick, 40-inch stems bearing fat, puffed bells of blue-violet pencilled with hyacinth. The huge, almost cordate leaves are glossy dark green and often stand almost horizontally, held by short, broad petioles. The sudden, sharp tip twists abruptly down. Moisture accruing on the blade drains quickly down the deeply engraved veins and hangs suspended from this tip for a moment before dropping. Hence the common name, dewdrop.

The *Hosta elata*, *H. sieboldiana*, *H. fortunei* complex appears at first to be just that . . . complex! Herein are contained all those *Hosta* possessing more or less pruinose leaf-blades with a cordate base. Let's see if we can sort out those we really enjoy in the garden.

*Hosta elata* (sold as *Fortunei glauca robusta*, *H. fortunei* var. *gigantea*; also under common names of fortune and the tall cluster plantain lily) has leaves you'll love. Unfurling as huge, crinkled, blue-green blades, one will note the glaucous bloom passes from the upper surface as summer advances. Some may remain in the vein grooves. Pale bluish-lavender flowers occur in July on 3-foot stems. There appear to be two common forms of this species sold under the same name. They differ mainly in width of the blade and possibly in time of bloom. The type most available to us is the "broad leaved" form.

*Hosta sieboldiana* (also sold as *H.*

*glauca*, *H. fortunei*, and under the common name short cluster plantain lily) bears the most enormous leaves of all. They are broad, cordate, not undulate at the margin, very thick and rigid, with both surfaces overlaid in a heavy blue-gray lustre. They average 12 to 15 pairs of lateral veins. In early July the flower stem lifts only far enough above the foliage to reveal the nearly white, pale violet blooms crowded into a short, dense raceme. It develops numerous seed capsules. *Hosta sieboldiana* and its several variants are real show-stoppers in the garden. They are the most intriguing, hardest to find (and most expensive!) members of the genus *Hosta*. One extremely rare variant is *H. sieboldiana aureus marginata* which bears an interesting green-gold pattern around the edge of the leaf. (See illustration).

The *Hosta fortunei* group flowers late, has leaves with only slightly cordate bases, is slightly or not pruinose above and it averages 8 to 10 pairs of lateral veins. In this group the fruits are usually abortive.

The two I consider indispensable are *Hosta fortunei* itself and *H. fortunei* var. *albopicta* (sold as *Funkia viridis marginata*, *H. fortunei viridis marginata*). This variety is highly sought by arrangers and becomes quite a conversation plant in the border. The young leaves emerge in one of two patterns. The outer rosette usually has leaves with a creamy white center bordered in dark green. The white portion is heavily reticulated with fine, green, lateral veins. As the season advances this inner area is converted to green. The inner rosette of leaves emerges with their central portions a smooth, attractive chartreuse, again bordered in heavy green. The chartreuse area darkens gradually and evenly till the two greens are almost indistinguishable.



FIGURE 3.  
Variations in form, color and size of leaves in the genus *Hosta*

There are other *Hosta* growing in my garden which have not at this time been sorted out as to species and variety. For instance, I have five quite different plants, each listed as *H. glauca*. Of this quintet, one of the most difficult to come by is also the most difficult to get growing. It remains an inch high in spite of all my exhortations. Its near neighbor is an exciting fistful of fat, green-gold leaves edged in green.

There are numerous hybrids of the genus now coming onto the market. One, called 'Royal Standard', promises the fragrance and dignity of its parent, *Hosta plantaginea* but in lavender form. Another, 'June Beauty', extends the flowering period for this genus by blooming two weeks earlier than other forms. 'Japonica Blue', from the Montreal Botanic Gardens, claims to withstand heat, cold and drought. The already popular 'Honey Bells' has proved to be a tremendous grower with 4-foot bloom stalks. 'Nakaimo', from Japan, bears light green, round leaves in a choice low mound and may bloom twice in one season after it is established.

And there are many more. Right now I have a fence row of fascinating newcomers digging their toes into Colorado soil. More are coming this fall. Soon there will be a collection starting at the Denver Botanic Gardens. Watch for it.

The story's told. It's up to you.

(I beg the poet's pardon).

I hope I've helped you want to plant  
Some *Hosta* in your garden.

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#### Illustrations

- Courtesy Dr. Robert Kosanke
- Fig. 1. A variety of *Hosta fortunei* (young plant)
- Fig. 2. *Hosta sieboldiana aureus marginata* (young plant)
- Fig. 3. Variations in form, color and size of leaves in the genus *Hosta*

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# RED OWL

# SIX-LEGGED LIONS

DR. FRED N. ZEINER

IF YOU HAVE a garden, it undoubtedly has ants and aphids and you are much aware of their presence. Perhaps you are unaware that valuable allies are also probably present as an aid in your efforts to reduce the population of these pests. It is to be hoped that you have not inadvertently eradicated these allies, too, in your battles with aphids and ants. The predatory insects I refer to are the aphis-lions and the ant-lions. With each of these it is the larva whose voracious appetite has provided the "lion" part of the name.

The adult aphis-lion (Figure 1) is a delicate slow-flying creature about half an inch in length. It is usually pale green and its wings have many fine veins. The common names are apt . . . lace-wings or golden-eyes. The odor of the adult is much less delicate than its structure should you have occasion to handle one.

An early indication of the appetite of the young is seen in the way the female deposits her eggs. Rather than

laying them in a mass as is the common method with insects, each is attached to the end of a stalk of stiff silk, the other end being attached to the underside of a leaf. There may be about one dozen eggs per leaf. Upon hatching, they drop from the stalk. Were they in a mass (and this can be arranged experimentally) the first one to hatch would proceed to eat its brothers as they in turn hatched.

There are those with more time than most of us who have tried to count the number of aphids or other small insects that constitute a meal for an aphis-lion. No counts are available since the investigators quit before the aphis-lion. Obviously, these little fellows should be encouraged, in spite of their appearance (Figure 2), which is much less pleasing than the adult's. Together with the lady-bird beetle, they constitute an effective control measure.

Adult ant-lions somewhat resemble small, slow and rather awkward dragonflies. They are considerably larger

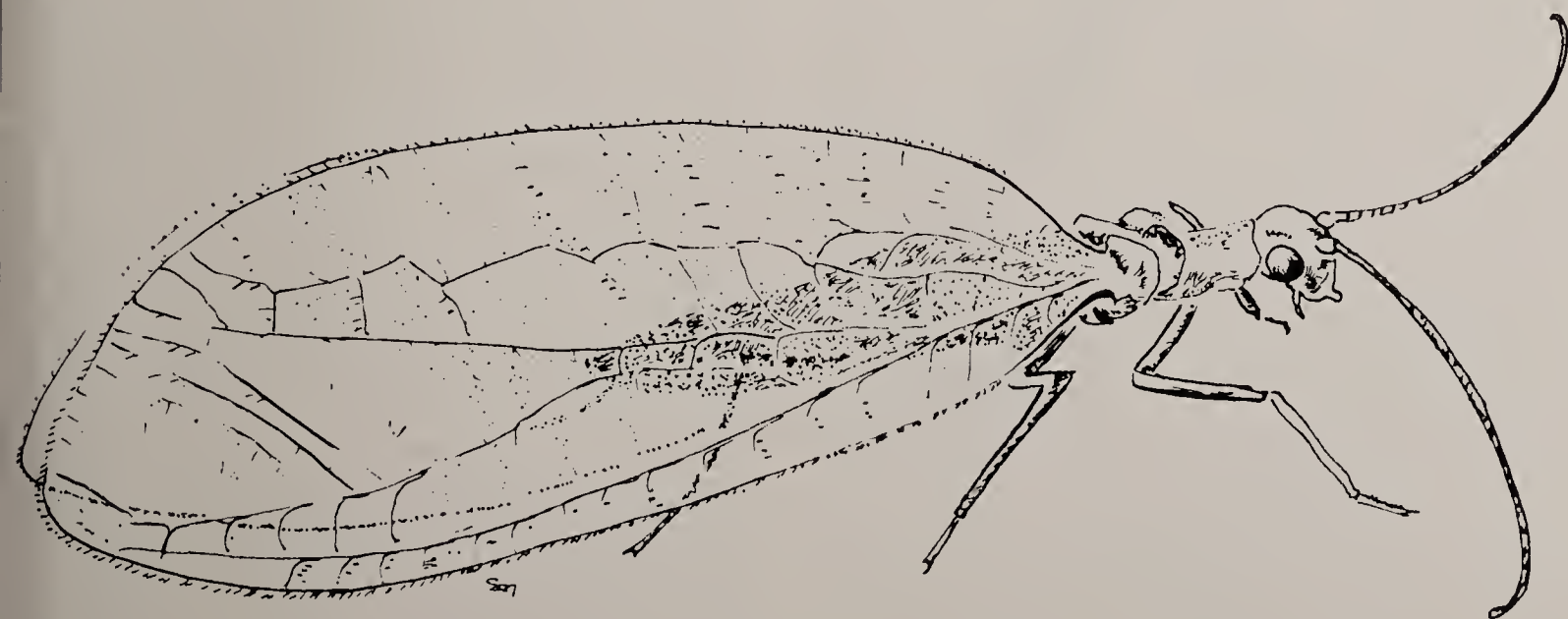


FIGURE 1.  
Adult Aphis-Lion

than their distant cousins, the aphisions, and are dark brown or black but with the same basic construction.

The larva is commonly called a doodlebug. In that it traps its prey, the term "lion" is inappropriate. It digs a conical pit, having steep sides, in sand or loose, dry soil. It lies buried at the bottom of the pit with jaws cocked and ready for the ant that falls over the edge and tumbles to the bottom amid a shower of sand. (Figure 3).

Good places to look for doodlebugs are habitually dry areas such as under eaves or overhanging rocks. We have our best luck finding them this time of the year, not only because the weather is normally drier, but also because we have become bored with watering the yard. Look for dimples in dry soil which upon closer inspection, are really conical pits about an inch in diameter at the top. Drop in an ant or a grain of sand and watch the fun!

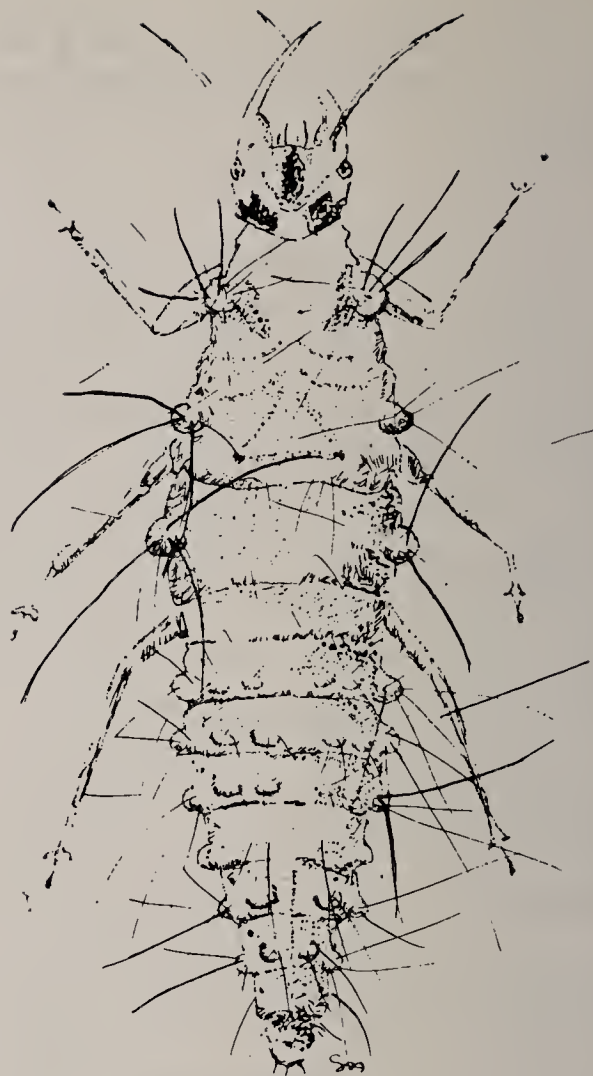


FIGURE 2.  
Young Aphis-Lion

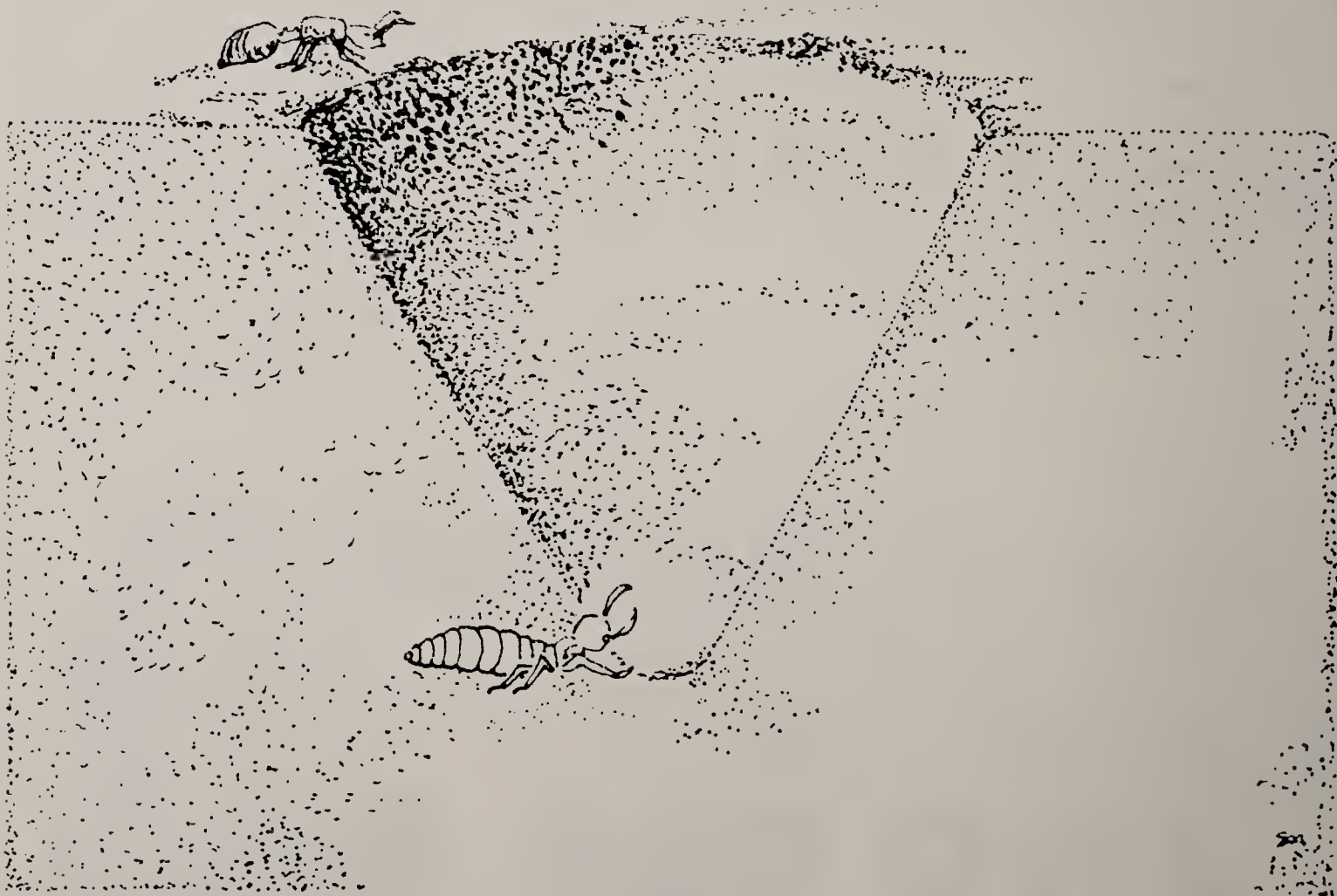


FIGURE 3.  
Adult Ant-Lion

# TOMORROW'S GARDEN FLOWER

GLENN VIEHMEYER

YOU, WHO LIVE along the foothills of the Rockies are missing a bet if you do not know and use penstemons in your gardens. This is probably our most showy genus of wild flowers as well as being one that appears in many forms and colors. Most of you who read *The Green Thumb* know penstemons but I doubt if many of you have had the pleasure of seeing this wildling in all its forms and colors.

Native to North America and with its center of distribution in the Rocky and Cascade Mountains, the genus has a distributional range that stretches from the highlands of Central America to the mountains of Alaska; from the Atlantic to the Pacific; from the alpine meadow through desert and plain to the seashore; a wide ranging genus made up of a multitude of species and forms. Here is a species group that offers the gardener much for the border and rock garden. To the geneticist, it is an excellent tool for study of the mechanisms that separate the species in nature; to the evolutionist, penstemons are a prime example of evolution

in action. Each of these aspects would make a story in itself. So, let us consider penstemons as a garden subject.

What may be the world's largest single collection of penstemons is growing at the North Platte Experiment Station of the University of Nebraska. Here, many species and forms of penstemon are being used in a breeding project designed to domesticate this fine wild flower. Over a hundred species and thousands of hybrids are growing at North Platte. From this mass of material, hybrid and species seed is flowing out to those who are interested in adventuring into the unknown area of taming a wildling and molding it to man's use and pleasure. Already hybrid forms of penstemon are moving into the trade and it seems certain that these will be replaced by even better ones in the near future. But — let's stop and look at the penstemons themselves.

The genus *Penstemon* might be divided in many ways but let us divide them into classes the gardener can

understand and use. First of all, let me tell you that penstemons are specialists. Over the millenia they have adapted to very specific habitats and are not exactly happy in sites that differ greatly from their chosen homes. He who would bring the pure species to his garden and grow it to perfection will simulate the habitat in which he found it growing in nature. If he does this he will have magnificent plants and shows of bloom. If he fails to meet the plant's requirements in growing conditions he should have left it growing on mountain top or talus slope. Growing the pure species is a challenge. Growing the new hybrids is another thing and one that anyone can do — but more about that later.

So now to the grouping of penstemons according to their garden uses. First of all, let us think of rock garden species. In the deserts of Colorado and Wyoming you will find the Ericopsis. *Penstemon laricifolius exilifolius* is a real honey with a tuft of pale green larch leaves making a 3 to 6-inch mound of foliage and its 6-inch stem is laden with little white bells. This is common along the roadsides in the flatlands between Laramie, Wyoming and the Colorado state line. This is easy to grow in full sun and dry soil. To the south you will find *P. liniaroides* in its various forms. The subspecies *compactifolius* is found in northern Arizona and, I suspect, southern Colorado. *Penstemon crandallii* in its typical form has been collected south of Hartsel, Colorado and the subspecies *P. crandallii glabrescens* near Saguache, Colorado. *Penstemon cespitosus* and its forms are common and well distributed over dryer sites of the southern Rockies and the semi-desert areas. This is a ground-hugging form that you won't see unless you stop the car and look

for it. It is variable and appears in a number of subspecies. In the Red Desert of Wyoming you may find *P. acaulis*, a real toughie as far as garden use is concerned.

The second group of rock garden penstemons you will find in the high Rockies and mountain meadows. These are the mint-flowered, mat-forming penstemons that follow the Rockies from Alaska to Mexico. Less spectacular than the taller and larger flowered kinds, they nevertheless have high value in the proper setting. They are common in the foothills and front range and in the Cascades. In the wild on their rocky ledges and talus slopes they may be tiny. When brought to the garden they prosper and may make mats of foliage and flowers 2 feet across. Most are dark blue but one species, *Penstemon confertus*, is yellow.

Among the taller, more showy species that do best in the border are the bright blue *Penstemon glaber*, *P. strictus*, *P. unilateralis*. These range widely through the Rockies, they are easily grown from seed and you can collect enough tomorrow to plant a whole garden if you live within a day's drive of the front range of the Rockies. Even more spectacular is *P. mensarum* which is endemic to the central Rockies. I have found it near Redstone, in McClure Pass and on Grand Mesa. You will have to hunt for this but it is worth the effort for it is one of the best of the blue and the deepest blue of any I have seen.

In southern Colorado you will find the red-flowered *Penstemon barbatus torreyi*. This may be the first penstemon used as a garden plant. It has been widely used in breeding and has contributed characters to most of the

new hybrids we may now enjoy in our gardens. This is extremely variable and if you collect it, perhaps you should do so during the blooming season. Plants vary from 20 inches to 6 feet tall and flower spikes range from sparsely to densely flowered.

In still another group, one that requires careful handling in the garden, are the true desert forms. These are among the best but hate shade and wet feet. If you have a wind-swept bank in full sun, they will do a job for you. Most of them are tall (3 to 7 feet) and have large flowers. *Penstemon harvardii* from the West Texas-New Mexico area is a showy scarlet color. *Penstemon palmerii* from the deserts ranges through white and pink and is one of the few sweet-scented ones. *Clutei*, from the cinder beds of Sunset National Monument is a good rose colored one, as are *parryi* and *pseudospectabilis*. These are beautiful but, unless you can meet their needs for dry soil and windy habitats, they are not for you. They will die of disease or poor drainage. So much for the species.

If you want the greatest show for the least effort, you should consider the hybrids. These combine the germ plasms of two or more species and are far less particular about growing conditions. Happily, the mating of two unlike entities with different environmental requirements opens the way for a whole series of interactions and reactions. The first generation plants seem to require an environment intermediate between those of their parents. But in the second and later generations, hundreds of new combinations take place. In these generations the germ plasms of the two parents are recombined in an infinitely large number of new relationships. This applies to both visible



NARROW-LEAVED PENSTEMON

(*Penstemon angustifolius*)

Original drawing from the Emma A. Ervin Collection.

characteristics, such as leaf shape and flower, and physiological ones that make for adaptability. Thus, when a species from a mountain top and one from the desert are crossed, the first generation plants will be quite uniform. In the second and later generations, individual plants will appear that fit well in any habitat between the mountain top and the desert. In the advanced generations of the species hybrid, the specific environmental requirements of the parent species are lost in a maze of recombinations. If a third, fourth and fifth species are added to the mixture there will be segregates that will fit into almost any garden. These can form the basis of a race for your garden.

In terms of the layman this means that you, the home gardener, can take seed of these complex hybrids, plant them and find among the resulting progenies (if they are reasonably large) individuals that are well adapted to your garden. Such individuals can be increased as clones or can serve as the parents of the next generation. By selecting the best-adapted individuals as seed parents and by growing several generations in your own garden you will soon have a strain that fits the new habitat you have provided. This is plant breeding in its simplest form but it works. By doing this you can lend a hand in creating a new garden flower for our gardens. If you get something good, share it. This may prevent it from being lost.

The new hybrids have much to recommend them. They are, first of all, easier to grow. Second, they have developed a character for repeat bloom. Individuals differ in ability to repeat but this can also be intensified by a simple program of selection.

While there are many exciting hybrids coming along, there may be two major classes to place them in. The Flathead Lake series with *Penstemon barbatus* in the background is easiest and should be tried everywhere. *P. barbatus* has served as a vehicle to bring many showy but difficult, prairie and mountain species into a usable mixture. These simply can't be described in any but the broadest terms because they have shapes and sizes for any garden use.

The Fate-Seeba hybrids of *Penstemon grandiflorus* of the prairies and *P. murrayanus* of the desert are tall, showy, foxglove-like plants. Largest and showiest of all are the Henry hybrids of *P. cobaea* and *P. triflorus*. Flowers may be 2 inches long and as wide. They come in rich shades of purple and rose.

In closing, the penstemon is an exciting newcomer in the garden world. There is much to learn about it and its uses. For those of you who are interested in trying these plants in your garden, we have a bulletin, *Penstemon in Your Garden*, that is yours for the asking. Write to me, Glenn Viehmeyer, at the North Platte Experiment Station, North Platte, Nebraska and I'll send you a copy and enclose a package of penstemon seed from one of our hybrid lines.

Even better, you might join the American Penstemon Society and have access to the seed exchange and the two or more hundred kinds of penstemon seed. This is free to members and the \$2.00 membership will entitle you to many dollars worth of seed. You can obtain the details for joining from Mrs. E. A. Boyrie, 614 NW Macleay, Portland 10, Oregon. Try penstemons, you'll like them.

# PUBLIC PARKS and the LANDSCAPE ARCHITECT

E. W. WALLACE, *Director, Planning and Design  
for Denver Parks and Recreation Department*

NOTHING IN THE world "Just Happens" and a successful recreation environment is no exception. The achievement of that sense of being environed in great and pleasantly organized space requires planning. Arrangement of different types of recreational facilities within a city or within a park area must be organized in relation to use, circulation, topography and existing elements in the landscape. There are too many factors of site conditions, area needs and economics to make any hard and fast rules regarding these relationships. For this reason, landscape architecture in the park field is a highly creative work. The part of the landscape architect in parks, as in any field, is to approach design with a breadth of view; out of his training to bring order and beauty; and to bring an attitude of mind not circumscribed in any way.

There is a certain basic philosophy to park work that applies to the landscape architect — in fact, to all people in park work. Unless man's interest in, and use of, the techniques of designing, constructing and operating parks are

dominated and motivated by such a fundamental and absorbing interest in the people who use the parks and in all the details of *how* they use them and how they can be induced to use them with greater benefit to themselves in the long run, mere technical skill in any or all of these phases of park work tends to become academic and sterile. In park design, the landscape architect must remember first and foremost that he is dealing with human beings. Their work methods may be changed radically over a period of months and their pattern of living over a period of years but their basic personality changes with glacial speed.

Kevin Lynch made a study at M.I.T. (Massachusetts Institute of Technology) of childhood memories in order to identify environmental influences that carried most strongly over the years. The five most important memory categories were all in the area of landscape architecture; lawns, other ground surfaces, topography, wall materials and trees. These were the things that influenced people and all were remembered with strong affection. After grass, they best liked earth areas they

could manipulate. They recalled preferring to play anywhere but in the formal playgrounds and they all had, whatever their current skills, a keen and well-expressed sense of the spaces in their childhood environment. Water was often mentioned, always with pleasure. This underlines the evidence we have gathered of adult demands for relaxation, informality, space and the opportunity for creative leisure time. It presents a clear challenge to the landscape architect to make sure that these things are not forgotten.

The types of recreation that the parks provide are quite varied and the kinds of lands that are set aside for the various types of park uses must be governed by the uses that are provided for the people. Thus, we have neighborhood playgrounds, community recreation areas, large scenic parks and parkways, regional park systems with their recreational activities and the state park systems, which preserve for the use of all people large scenic parks and

camping areas as well as historic sites. Then, of course, we have the scenic, scientific, prehistoric and historic areas that are of national importance. While the combination of all of these areas is necessary to satisfy the public's leisure time needs, nevertheless, one cannot take the place of another. We need them all and we need landscape architects trained in each special phase of their development.



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# HYDROPONIC GARDENING

HUGH L. POTE

THE MOST remarkable thing about Mr. Norton Novitt's greenhouse is that, regardless of where you look, there is no soil to be found. The lush tomatoes growing there are planted in plastic containers filled with a mineral nutrient solution. It is this solution which replaces the soil commonly surrounding the roots of plants. Quite obviously, these plants were well-supplied with all the plant food necessary for growth. Large scarlet clusters of tomatoes hung from sturdy vines stretching toward the fiberglass greenhouse roof.

This method of plant culture is an example of hydroponics; the science of growing plants in mineral nutrient solutions. Although not a new technique (first started 300 years ago), it is seldom practiced by the average green thumb. Many are daunted by the mistaken idea that a degree in horticultural science is necessary to experiment with hydroponic gardening. Mr. Novitt emphasized that this definitely is not the case. The ability to follow a good cooking recipe is the basic requirement. There are, in a number of books and government pamphlets, formulas describing the preparation of the nutrient solutions. The Denver Public Library lists 7 books under the heading: Plants — Soilless Culture which are helpful in this field. The Denver Botanic Gardens Library contains 4 editions in this same category. Mr. Novitt especially recommends the small book by Tiquet, *Successful Gardening Without Soil*. Here may be

found information on sand and gravel culture as well as the water culture method.

Originally a technique for studying the mineral nutrition of plants, (to find out what soluble minerals were involved in plant growth), the gravel culture method has been used to grow salad crops in places where the soil was not suitable. The U. S. Air Force installation on Ascension Island during World War II really proved the value of this technique. Here, tons of fresh vegetables were grown for transport to areas where only "C Rations" had been available. Closer to combat areas, transportation costs were not prohibitive as they were from the United States.

At the present time, hydroponic culture is widely used in the experimental study of plant nutrition. Temperature, air (carbon dioxide), light, water and humidity are controllable. Now it is possible to accurately control the kinds and amounts of minerals (and some plant hormones) available to the plant. It was found that this soilless nutrient culture was no magic formula for bigger and better flowers and vegetables. Plants reacted much as they did in any rich soil. However, the grower has much more control over the rate of growth and quality of his plants by varying the concentration and composition of the nutrient solution. This is easier to do in solution culture than with variable soils. A grower using soil accomplishes the same thing by withholding water or adding fertilizer, thus creating a more concentrated or differ-



HYDROPONIC — Young Tomato Plant

ent soil solution about the roots of the plants.

Returning to the specific example at hand, Mr. Novitt told me that he had tried this method of plant culture for a number of years on a small scale. However, only for the last four years has he conducted greenhouse and outdoor experiments. He spends as little as 15 minutes a day in caring for his plants. Once a month new solutions are made and are substituted for exhausted ones. This requires about two additional hours. Daily chores include tapping the tomato flower clusters to assure pollination (no wind in the greenhouse), harvesting and weighing, replacing of water lost by leaves (transpiration), any pest control measures (usually very little trouble here, no soil involved) and the weekly adjustment of the pH (measure of the acidity of the solution). Seeds are started in plastic cups using a neutral inorganic material such as horticultural perlite for the rooting medium. Soon after germination the seedlings are watered with a weak nutrient solution. When one month old, the tomato plants are transplanted bare-root directly into the solution tanks. A very important factor is the aeration of the tanks. In good soil culture, spaces between the soil particles usually contain sufficient oxygen for proper plant growth, but aquarium aerator stones and a pump are necessary accessories for water culture. Mr. Novitt emphasized the reasonable cost of permanent equipment such as the plastic containers with covers (hardware store item) and aerators with pump. The usual soluble mineral fertilizers in measured amounts are used for nutrient solution.

Another soilless method used by Mr. Novitt is that of growing plants in an inorganic medium, such as horticultural

perlite and sub-irrigating with the mineral nutrient solution once a day. Here, of course, aeration occurs as the solution drains. Growth under these conditions is equal to that in water culture. Plants grown in this manner also were heavy with fruit.

Aside from the joy of working with plants and providing a steady supply of tomatoes for his table, Mr. Novitt has other reasons for his interest in this unique hobby. He would like to develop a growing method for producing the taller tomato varieties with shorter internodes, in other words dwarfing — less stem between the fruit clusters. This would be of great value in commercial applications. Another project of interest to him is a method of growing a standard early variety that would bear fruit much earlier outdoors than is possible today by eliminating transplanting shock and other setbacks. His goal is to be able to pick ripe tomatoes out of the garden by the Fourth of July in Denver's cool climate. At the present time, approximately four months must elapse between planting of the seed and ripening of the first fruit of most varieties. Most satisfying of all would be interesting others in this fascinating hobby of his.

Mr. Novitt has a recommendation to those whose curiosity has been aroused by this description of his work and would like to try it. Naturally adapted to water culture, watercress can be grown in glass jars in nutrient solution on a window sill, without aeration. A cool temperature and a small amount of sunlight can produce 1 inch of new growth per day.

There are many of us who enjoy gardening, both indoors and out, but none of us has as much control over the health and well-being of our plants as one who practices nutriculture.

# Mountain Kitchen "MAGIC"

STUART A. MACE,  
Toklat, Ashcroft, Colorado

"WHY DO THINGS THE HARD WAY?" is a question heard more and more frequently. This attitude has become so prevalent that it has promoted the rapid development of "short cuts" in nearly every phase of modern living. Alas, in the field of cooking, it has eliminated much of the excitement, variety of flavors and individual adventures in eating which were a joy to our forebears. Truly honest taste treats are seldom found these days.

Half in rebellion against insipid conformity and partly because of the joy of rediscovering pleasant old tastes, jams and jellies are still made from all of the wild mountain fruits at Toklat in Ashcroft, Colorado.

The early homesteaders in the mountains subsisted on very plain and simple fare. To "flesh" it out and add variety, they lived a great deal on the wild produce of the land. Since most of the wild fruits have little or no pectin, early efforts to use them went into the preparation from the wild fruits of delicious sauces and thick syrups for pancakes. When crab apple trees started to mature in the fledgling gardens, many of the women canned the juices

from the wild fruit until apple harvest time and then used them to produce firm, delectable jellies (one-half to one-half quantities), thus utilizing the apples' generous pectin content.

Today, the old art of wild fruit jelly making employs two very modern tasteless pectins made from oranges and fresh lemon juice. With modern pectin it is unnecessary to cook the jelly as long as previously. Consequently, more of the subtle, natural flavors are retained. With the addition of lemon, the original flavor of the fruit is preserved. The boast "better than grandmother made" applies not only to modern stone-ground bread but also to these delectable syrups and jellies. Also, with the advent of the deep-freeze, it is possible to store the wild fruit juices in order to retain freshness, instead of canning them until jelly-making time. Jellies at Toklat are made in the off-tourist season when there is plenty of time to strive for perfection.

Added to the pleasure one finds in many new taste thrills is the outdoor fun of seeking new fruit patches at precisely the right time of fruit maturity (being just a little craftier than the

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birds) and the relaxing detachment of picking the fruit—always on one's own property, of course. This is a hobby in which one can lose oneself completely, and always in a pleasant environment.

The English language is inadequate in any attempt to describe or analyze the tart, mellow, mild, pungent, sometimes illusive flavors of the wild juices employed in the art discussed here but a few of the tempting fruits, with a flavor analysis, are listed:

- Wild plum —  
very tart, clean and bouncy
- Chokecherry —  
mellow, rich, with a light aftertaste
- Wild Currant —  
more mellow than cultivated garden cousins
- Gooseberry —  
rich and mellow, good mixed with nuts and brandy
- Serviceberry —  
light and pungent with a light aftertaste
- Alpine red elderberry —  
bittersweet with a quite puckery aftertaste

- Hollygrape —  
rich, heavy and pungent
- Thimbleberry —  
mild, light and sweet
- Raspberry —  
similar to the cultivated garden flavor —  
richer
- Buffaloberry —  
mellow, rich with a buttery aftertaste
- Alpine black currant —  
heavy, strong, better blended with nuts and brandy (must be dead-ripe)

This list may not be imposing but it may challenge the reader into a quest for some old-fashioned flavors. As a retreat from mediocrity, one could close one's eyes and envision a meal such as the mountain country pioneers enjoyed: sourdough pancakes basking in wild chokecherry syrup or white clover mountain honey, crisply fried fresh brook trout with a garnish of wild mushrooms and on and on.

Editor's Note: Mr. Mace is proprietor of TOKLAT where many of the delicacies mentioned in his article (and many others) are available.



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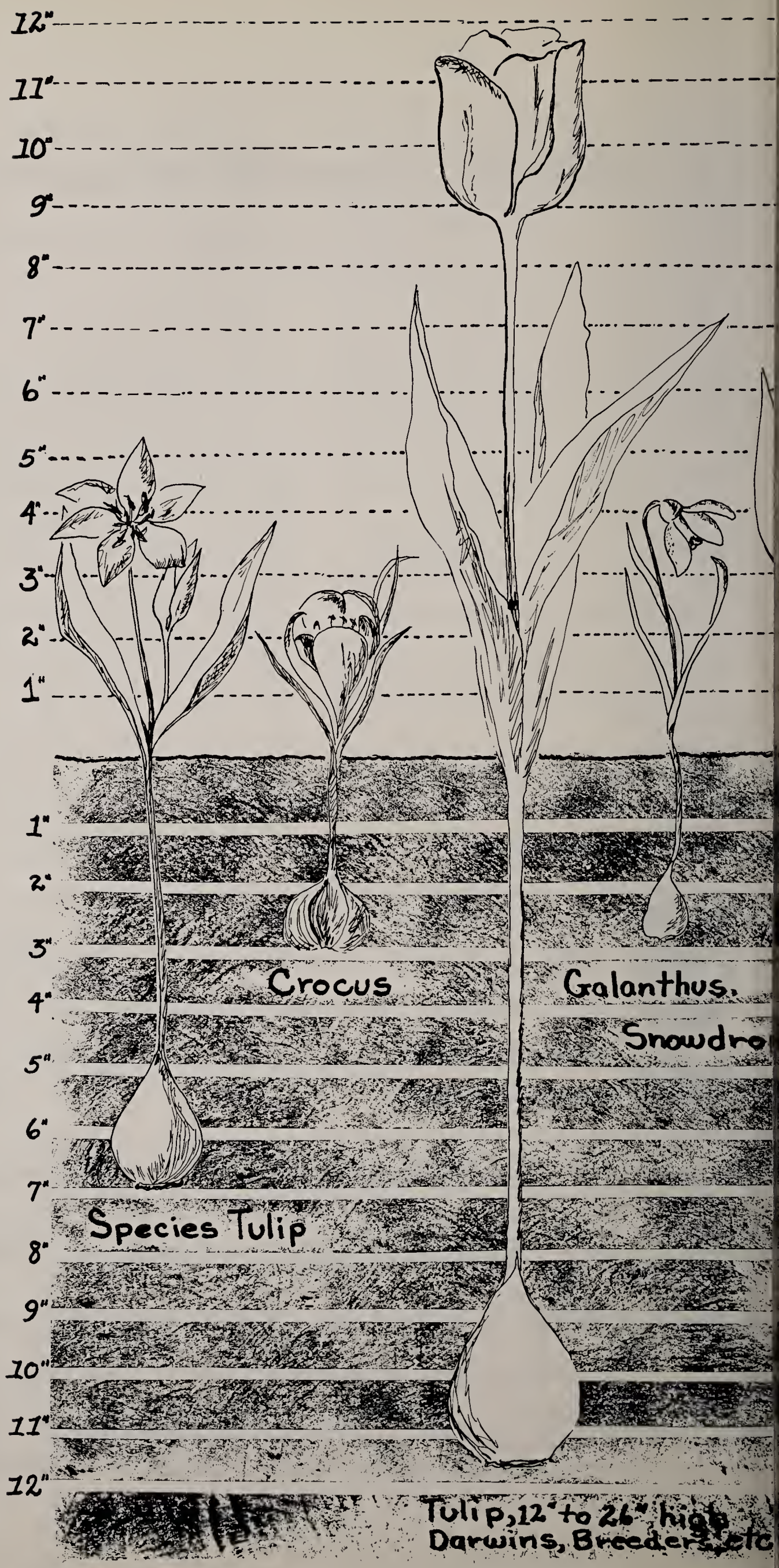
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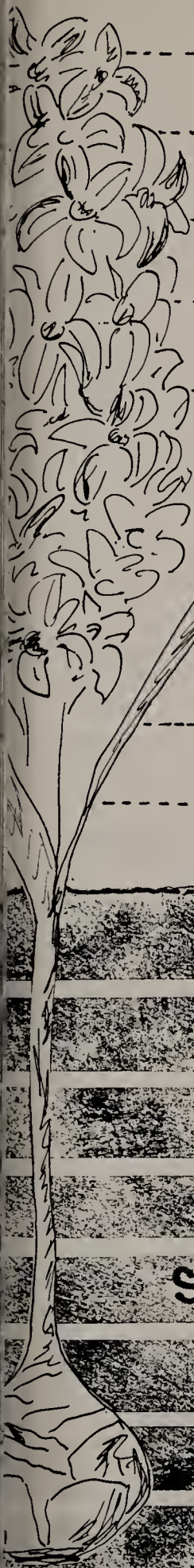
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Therefore, a **new volunteer organization — Associates of Denver Botanic Gardens — is being formed.** Membership will be open to any man or woman who is interested in the Gardens and wishes to help. Dependable workers are needed for the following activities: 1) to groom the plantings in the Gardens, 2) to guide tours through the various units of the Gardens, 3) to act as hostesses in the House, 4) to assist in the Library, Herbarium, and proposed gift shop, 5) to help with educational programs, 6) to help with stenographic and clerical work, labeling, mapping, and flower arrangements. More information can be obtained at Botanic Gardens House — or you can phone for registration or fill out the membership blank on the following page. Manager of the Associates is Mrs. Chard Smith, Jr. (756-1327), Assistant Manager is Mrs. Graham Morrison (424-0706).

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## THE COVER

GREETINGS

*Drawn by Susan B. Ash*



# Orchids

as

## House Plants

FRANK RICHARD

CERTAINLY, grow orchids as house plants. It's a fascinating hobby! Not with the same techniques as for philodendrons or Saintpaulias or coleus, although several of the cultural requirements for these popular, easy subjects coincide almost exactly with those of the aristocratic orchid.

Temperatures, for example: 62-68 degrees, nights, allowing a 15-20 degree rise during the day. Light: good, bright, strong light — never direct, undiluted sunshine. Feeding: necessary, moderately. Soil and watering: here there is a difference in orchid culture. Soil, as we temperate-zone gardeners know and use it, has no place in the culture of tropic-zone epiphytes. Watering can be neatly summed up (possibly over-simplified) by advocating a high moisture content in the air and lots of air around the roots.

You will need to learn some new names and terms but all of these are certainly no more difficult to learn than the names of new friends and neighbors when you move to another town or across the city.

Let us begin by learning the language. Parasite? NO! This pernicious libel must be laid to rest, once and for all. There is no parasitic plant among all the vast orchid tribes. Many orchids are epiphytes (or air plants); in nature, the trees or rocks on which epiphytes grow contribute only a site, nothing more. There are terrestrial orchids, too, orchids whose roots are firmly entrenched in Mother Earth. However, since nearly every would-be orchid grower wants to start with a big, showy, lavender cattleya, this introductory article will deal with epiphytes.

Your first orchid, a cattleya in all likelihood, will come (or should) already potted in little chunks of bark. Water runs through it as fast as you pour it on, in the same manner it runs down the bark of the branch on which the wild orchid grows. Cattleyas and other epiphytes have spent several thousand years learning to live with this kind of watering and they like it. If you water your own orchids this way, they will live with you and like it. NEVER

let your orchid pot stand in water, even for a few hours.

Now — your pot must be so placed that water can drain out of it rapidly and completely. The easiest way to achieve this drainage is by supporting the pot on or above a saucer or tray of coarse gravel or, better, chunky porous material such as coke, pumice, charcoal or volcanic scoria (see your roofing contractor). Some water is kept in this saucer, the level maintained at all times **BELOW** the bottom of the pot. Evaporation from this constant water level is of help in maintaining humidity.

Humidity is lacking here on the high plains but a high relative humidity is of utmost importance in successful orchid culture. In habitat, orchids are showered, sometimes several times daily. They are bathed in fog often for hours at a time. They also dry out between showers and fog, a fact unknown or forgotten by the over-anxious neophyte. Keep a Windex or other small, inexpensive sprayer full of clean water handy to mist over and around the pot, just enough to dampen it well several times daily. Keep your plant near the kitchen sink where air is usually more moist than in other rooms. If you are lucky enough to have a commodious, well-lighted, modern bathroom, you might be amazed how your plant will thrive there.

Very frequently first orchids are gift plants brought or shipped by friends from large commercial growers in California or Hawaii. These can be brought into bloom very easily by watering thoroughly on arrival. Let drain, then place the pot in a jardiniere or small plant tub of a diameter not less than 3 inches nor more than 6 inches greater than the outside diameter of the pot. Pack the intervening space firmly with sphagnum moss which has been dam-

pened enough so that no water can be squeezed out of it. Put about an inch of this same moist sphagnum moss over the top of the pot. Mist over this twice daily or enough to keep it barely damp. **DO NOT ADD** water to the packed pot for the one to two weeks it takes for the flowers to open. Packed in this manner an adequate and uniform moisture level will be maintained around the roots for at least two weeks. In fact, to add any more water than the mist as explained above is positively detrimental and dangerous to the well-being of the plant. All you need to do is to place the packed plant in light and temperature as specified above, relax and enjoy those gorgeous blooms as they slowly unfurl. Incidentally, the average cattleya requires three full days from the time the bud first pops to achieve full mature size and color.

Actually, you have to work hard to kill orchids. They are hardier than the average person realizes. Our first plants, back in 1947, numbered seven and it took me four months to kill three of them! The other four and their progeny are still with us.

If these notes have stirred your interest in orchid culture, stop in at the Helen K. Fowler Library at Botanic Gardens House and, if you are a member of Denver Botanic Gardens, check out Rebecca Northen's *Home Orchid Growing*. There are other fine books on the subject in the library and you are welcome to browse if you are not a member of the organization. If, after embarking on or thinking about the hobby, you would like more news and views on orchids in *The Green Thumb* ask the editor to arrange for future articles on this subject.

Editor's Note: Mr. Richard is a partner in Richard's Flowers, Fort Collins, Colorado, florists and commercial orchid growers for nearly 20 years. He is president of the Denver Orchid Society.

# Joseph Oppe Seeks New Horizons

THE MEMBERS of the Board of Trustees, colleagues, the staff at Denver Botanic Gardens and the many other friends Joseph Oppe has made here regretfully bade farewell to him on Thursday, August 19th. The occasion was a get-together at a buffet party given in his honor and attended by more than 75 of his friends and associates.

Although most of those present were downcast over the thought of his departure, not one can deny that his future professional career is full of promise and offers a great challenge to his alert mind and enthusiastic approach toward any new and interesting situation.

His "new" situation is not quite that, however, as he is returning to Dawes Arboretum in Newark, Ohio, as Director of that well-known institution. Just prior to joining the staff at Denver Botanic Gardens, Mr. Oppe worked for three years at Dawes as Assistant Su-

perintendent. Due to his familiarity with the program there, it should not take too long for him to get his feet on the ground in his new capacity as Director.

Mr. Oppe feels that in the little more than 2½ years he has worked at Denver Botanic Gardens he has gleaned a great deal of valuable information, particularly through his association with Dr. Hildreth. He is hopeful that he will be able to institute some educational programs at the Arboretum similar to those being conducted at Denver Botanic Gardens. This applies specifically to our very successful Children's Garden project and other work with the schools.

All who worked with Mr. Oppe and were privileged to become his friends wish him God-speed. Our association has been far too brief but the hope lingers that one day it may be renewed. May the bright promise of the future be fulfilled for him and his wonderful family.



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RED OWL

# Pete Ponders

? ? ? ?

Dear Pete:

Why no illustrations for Mary Wilkinson's intriguing article "Beautiful Colors with Natural Dyes", in the Sept.-Oct. issue? It cried for pictures.

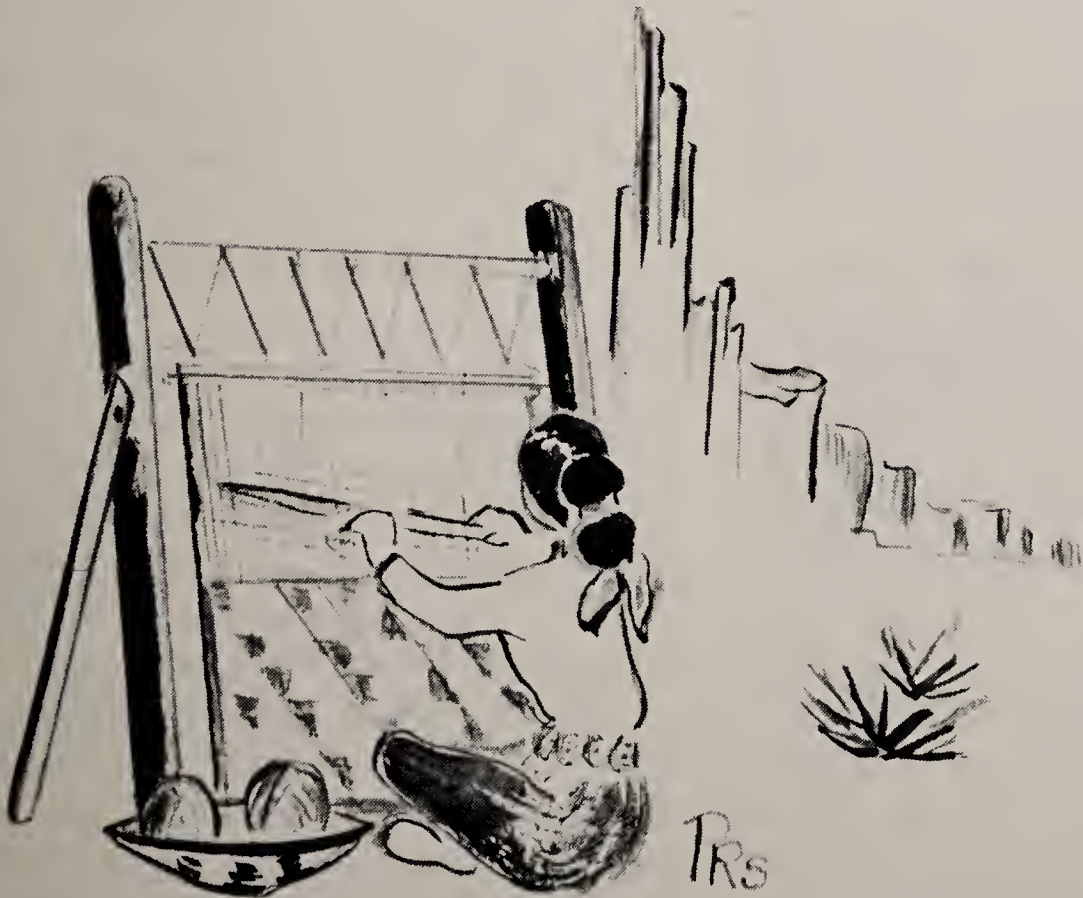
Dian d'Wool

Dear Di:

I cried, too. Illustrations we had! All carefully penned by Pen-sive Polly Steele. In transfer of editorial responsibility from Mr. Oppe to Mrs. Vincent the drawings became detached from the copy.

With apologies to Mrs. Steele and Mrs. Wilkinson we offer these illustrations as reminders that Mrs. Wilkinson's article plus a copy of "Dye Plants and Dyeing", published by the Brooklyn Botanic Garden, (both available here at the gift shop) will make holiday gifts cherished by jolly weavers through their dyeing days.

Pete



Drawings by Polly Steele

# Vegetative Propagation by Cuttings

ERNEST A. BIBEE

**A**MATEUR GARDENERS through the ages have known that propagation is one of the most fascinating aspects of horticulture. Today, because of the many advances in plant science, new heights of attainment are the general rule. In truth, the careful gardener can accomplish feats in the multiplication of plants that his grandfather would have considered almost impossible. Scientific research is responsible for many new methods and old-fashioned methods must give way when new ones enable us to produce plants of higher quality in a shorter time. It is important that practical plantmen keep abreast of research because plant propagation, with its many new innovations, aids and techniques, has become an advanced applied science.

Of the six methods used to reproduce tropical houseplants — seedage, division, layerage, marcottage, graftage and cuttage, the last is, by all odds, the most popular with home gardeners and so this efficient way of propagating plants will be discussed in this article.

A cutting might be defined as a separated portion of a plant that is induced to form roots in a new environment. In cuttage, pieces of stem with or without leaves, detached whole leaves, pieces of leaves or pieces of roots are used to produce new individuals. The tiny bits of living plant thus rudely

severed from their source of water and nutrients are dependent upon the skill of the gardener to carry them through the critical period until root systems, adequate to maintain the new individuals, are developed.

Cuttings should be taken from stock plants that are true-to-type and free from pests. The prime reason for vegetative propagation is that many plants, if propagated from seed, would not resemble the parents which produced the seed. There are several other reasons for vegetative propagation enumerated below:

- (1) Several valuable plants produce little or no seed.
- (2) Other plants produce seed which germinate with difficulty.
- (3) Some plants are more resistant to diseases and insects when raised on roots of related plants.
- (4) Some plants are hardier when grafted on the stems of others.
- (5) Other plants are more vigorous.
- (6) Other plants are propagated more economically by vegetative means.

The season at which cuttings are taken (the age of the cutting wood) is very important and all propagators determine the proper season for taking cuttings of each variety by trial. The cuttings are classified according to the kind of plant, whether herbaceous, deciduous or evergreen and according to the maturity of the wood, whether softwood or hardwood, as follows: (1) the herbaceous, (2) the deciduous

softwood, (3) the deciduous hardwood, and (4) the evergreen. The majority of the tropical plants is produced for the home from cuttings of the herbaceous and evergreen classifications. Since these cuttings have both similarities and differences in anatomy and maturity of the tissues, the propagator should have a working knowledge of these differences and similarities in order to know how to treat them for successful root production.

Detached stems with or without leaves are called stem cuttings and detached roots are called root cuttings. Of these two types, stem cuttings are most widely used in the production of tropical plants as house plants. Herbaceous cuttings are taken, as the name suggests, from herbaceous plants. Evergreen cuttings are taken from coniferous and broad-leaved evergreens. To produce a new plant the herbaceous or evergreen stem cutting must produce a set of roots. It is a matter of producing roots from shoots. Softwood tips, 3 to 6 inches long, are cut from healthy plants with a sharp tool. They are immediately covered with wet burlap or moss or placed in a plastic bag to protect them from drying winds. Cuttings may be made from wood below the terminal growth, but the tips are preferred by most amateur propagators.

In order to have shoots produce roots it is necessary to have proper healing of the cut surface. Rapid healing is indispensable to the welfare of the cutting. If the cut surface heals slowly or not at all, rot-producing organisms invade the tissues and the all-important water within the cutting escapes. Investigations have shown that the herbaceous cutting heals its cut surface with its cell sap. Immediately after the cut is made the intercellular spaces just beneath the cut become filled with sap and the unsaturated fatty

acids in the sap combine with the oxygen of the air to form a skin type layer of varnish-like material called suberin. This material possesses the unusual ability to admit and hold the water within the cutting and of resisting the attacks of rot-producing organisms.

The layer of suberin resists the attacks of organisms and retards loss of water from the cutting, but is effective for only a short time as it is very shallow and non-elastic. Since the layer of suberin cracks easily when stretched, it cannot adjust itself to changes in water pressure due to the intake and outgo of water within the cutting. Later a layer of more permanent nature is formed. It is called the cork layer and seems to be developed in the following manner. Certain parenchyma cells immediately back of the suberized layer lose their large vacuoles and begin the function of meristematic or dividing cells. They divide and the walls of the new cells become impregnated with suberin, tannin, and other materials which collectively are called cork. This layer being constantly renewed is therefore durable; since it is several cells thick, it is deep-seated; and, being elastic, it can withstand the stress and strain due to changes in water absorption and transpiration. This enables the cork layer to keep water within the



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cutting and to resist the attack of invading organisms.

The rate of root formation is determined by environmental factors such as humidity, temperature and oxygen supply. Also by factors of the cutting itself, such as the food supply, hormone supply, leaf area and the activity of the root-producing tissue.

Since our problem consists of producing roots from shoots we need conditions that will retard the growth of the top and facilitate the growth of roots. It is necessary, therefore, to keep the top cool and the basal end of the cutting comparatively warm. This may be done by applying artificial heat to the medium in which the cuttings are placed. This application of heat to the basal portion is known as "bottom heat." "Bottom heat" is provided in various ways: by lead-covered resistance wire, by hot water or steam in pipes, or by the bacterial action of manure. It has been shown repeatedly that high rooting-media temperatures, usually within the upper half of the optimum range of any given plant, greatly facilitate root production.

The propagator must keep in mind the importance of reducing the loss of water from the cutting. The cutting should not be allowed to wilt severely and never allowed to dry out. How can transpiration of the cutting be retarded? What is the relation of the relative humidity to the evaporating power of the air? Transpiration can be retarded by providing a high relative humidity. When the relative humidity is high the evaporating power of the air is low, and, with other factors favorable, the rate of transpiration is low. To provide a high relative humidity many kinds of practices are employed. Some cuttings are placed directly in water until they are placed into the rooting medium; others are kept in shade; others are

placed between two layers of moist cloth or paper. The cutting may be placed in plastic bags or other containers. With some plants which callus slowly, a special propagating frame is used in which a high relative humidity is maintained.

The formation of the suberin that seals and protects the cutting and the rapidly dividing cambium require abundant oxygen. Therefore, in the rooting of cuttings, media are used which will enable the growing points to obtain abundant oxygen and, at the same time, sufficient moisture for root production.

In addition to the several environmental factors, several plant factors must also be considered. The healing of the cut surface and the production of new roots require an available carbohydrate or food supply. Suberin and the layer of cork and the cells of the new roots are all formed from carbohydrates. Consequently, cuttings with an abundant supply of food heal their cut surfaces more rapidly and produce roots more readily than cuttings with a scant food supply. Investigations have shown that, with other factors favorable, cuttings high in carbohydrates root more quickly than cuttings deficient in these compounds. Therefore, cuttings from moderately vigorous plants and from plants grown in good light are likely to produce roots more rapidly and satisfactorily than those from extremely vigorous or from weakly plants grown in too much shade.

Other investigations have shown that substances other than foods are necessary for root formation. These substances are effective in small quantities in extreme dilute concentration and are called hormones. True plant hormones are complex organic substances produced by leaves and are found in the regions of buds. These hormones are transported by the vascular system and

may influence the root-ability of cuttings. The cutting may have an abundant carbohydrate supply but if the root-producing hormones are absent the roots will develop very slowly.

Many investigations have shown that the application of certain chemicals, called root-inducing substances, promotes the development of roots in the four types of stem cuttings. Root-inducing substances might be defined as those synthetic chemicals which have hormone-like action upon cuttings so that they may stimulate root formation. Of the numerous chemicals which have been tried, indoleacetic acid, indolebutyric acid, and naphthaleneacetic acid have produced the most striking results. These chemicals not only speed up root production but they also induce the development of a large number of roots and are now widely used in the propagation of many plants. They may be applied in the form of a paste, liquid or dust. Several of these chemicals dispersed in talc and sold under various trade names in garden supply stores, will help speed the rooting of cuttings when they are used according to directions. Carefully selected and prepared cuttings of the correct age and size, when dipped in one of these powders, can generally be expected to produce heavy root systems more rapidly than untreated cuttings otherwise handled in the same manner.

It must be forcefully stated that these chemical compounds are not substitutes for skill but, rather, they may be aids to rapid rooting. The propagator must control the environment into which the cuttings are set just as carefully as he would if no stimulant were used. Careful attention must be given to temperature, humidity, moisture and shading so that the environment will approach the optimum as closely as possible. There is little use in dipping cuttings that are to be stuck in a cold medium, as root-inducing action is stopped at low temperatures. Temperatures between 70 and 80 degrees F. seem to be best.

The fact has been emphasized that the cutting should not be allowed to dry out. To reduce the outgo of water the leaf surface can be reduced. Is this practice generally advisable? As previously stated, carbohydrates and hormones are necessary for the development of new roots. These carbohydrates and hormones are made in the leaves. Consequently, if reduction of the leaf area is necessary, it should be reduced only enough to prevent wilting and a high relative humidity should be maintained to keep the leaves turgid. The upper two or three leaves are left intact as cuttings will produce heavy root systems more quickly when a large leaf surface is present to supply food materials, hormones and vitamins. Investi-

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gations have shown that the old nursery practice of removing halves of the upper leaves actually prolongs the time that cuttings must remain in the propagating medium. Tip leaves that are unusually large, however, must be reduced to economize on space in the cutting frame if space is at a premium.

Beginning at the base of the cutting, trim the leaves with a sharp knife or, if the leaves come away readily, considerable time may be saved by stripping rather than laboriously cutting through each individual petiole.

If it is planned to use a root-stimulating powder, now is the time that it will be needed. The basal ends of the cuttings are moistened in water and then dipped one-half inch into the hormone powder. Excess dust is shaken off by tapping the cutting against the side of the container.

In the rooting medium, then open holes to a depth of about four inches and insert the cuttings at a considerable slant so that the leaves lie directly on the rooting substance. The rooting medium is pressed firmly around the cuttings and leveled off, after which the whole batch is gently flooded with water. It is no longer considered good horticultural practice to hammer the rooting medium solid with a brick and then open a furrow with a putty knife. Caution: if vermiculite is used, it must not be firmed.

After watering the cuttings in thoroughly, cover the box or container with a pane of glass, a double thickness of cheesecloth or a piece of glass substitute. For reducing the sun's glare, a shade of muslin should be suspended over the container if glass or clear plastic is used. The cover must be lifted each day so that the leaves can be sprinkled with a mist-like spray.

A water supply should be near at hand so that cuttings in conventional

cases can be sprinkled several times on bright, hot days. An atomizing nozzle for the end of the hose, a watering can with a fine spray, a florist's bulb sprinkler or one of the atomizers that are sold with bottled house insecticides can be used for this very important operation. In any case, water must be broken into a fine mist as it is applied. The exact amount of moisture needed can be determined only by trial and each grower must work out, for his own conditions, the optimum amount of water necessary for each kind of plant, root substance, time of year and type of case. If a glass cover is used, drops of water may condense and cover the inside of the glass each morning. If cheesecloth is used it should be kept constantly moist. Good drainage should be provided as the rooting medium must never become soggy or waterlogged.

As previously stated, some of the plant cells, usually the pericycle, possess the ability to revert to the meristematic condition and thus form new growing points. These new growing points develop into roots. Therefore, in the production of new roots from shoots, success depends in part on the activity of the pericycle. However, with some kinds, other tissues such as cortex and pith may form new growing points. Certain plants have a fairly well-developed pericycle and others have not. This may explain, in part at least, why some cuttings root relatively easily and why others root with difficulty.

When the young plants or rooted cuttings show an abundance of well-developed roots about an inch in length they should be potted.

Potting soil should be loose in texture, high in fertility, rich in organic matter, free of toxic substances and, for most ornamental plants, slightly acid in reaction.

# *How to Know the* **EVERGREENS**

DR. HELEN MARSH ZEINER

**A**RE YOU ONE of the many otherwise good gardeners who calls every coniferous evergreen a "pine" or a "spruce"? Why not take time to learn the common evergreens so that you can identify them at least to the genus?

The Herbarium Committee feels that the following key is simple enough to be used by the average gardener. It is by no means a complete key, but it does include the common genera you are likely to encounter in Denver.

If you have never tried to use a key to identify a plant, a brief word of explanation may be needed. Using a key might be likened to following clues in a treasure hunt, in which you must always choose between two clues. If you make the correct choices, you find the treasure. Following a key is also often compared with following a many-forked road in which you must choose between signs at each fork and, choosing correctly, arrive at your destination. Just as one sometimes takes the wrong fork in the road and must retrace one's steps, a wrong choice in the key means backing up and following the other choice.

In the key presented here, your first choice is between the two letter "A"s. If you choose the first "A", then your next step is to decide which "B" is correct. If you choose the second "A", your second choice is between the two "F"s", and so on until you arrive at the name of the evergreen you are identifying.



Colorado Blue Spruce

For those who would like to learn more than the genus, a brief description of common species and their distinguishing characteristics follows the key to the genera.

As a further aid in learning evergreens, the Herbarium Committee suggests that you watch for educational exhibits prepared by this committee and displayed at Botanic Gardens House.



Lodgepole pine

## KEY TO SOME COMMON GENERA OF *PINACEAE*

- A. Leaves needle-like .....B
- A. Leaves scale-like or awl-shaped,  
not linear .....F
- B. Needles borne in clusters at tip of  
short growth branchlets .....C
- B. Needles borne singly on the stem.....D
- C. 2-5 needles in a cluster.....Pinus, pine
- C. Many needles in a cluster (except  
on terminal shoots) and falling  
in the autumn....*Larix*, tamarack, larch
- D. Needles flat .....E
- D. Needles diamond-shaped or square  
in cross-section .....*Picea*, spruce
- E. Base of needles rounded into a  
"suction cup", buds rounded, twigs  
somewhat flattened .....*Abies*, fir
- E. Base of needles tapering into a tiny  
stalk, buds pointed. Cones, if present,  
bearing a conspicuous 3-pronged  
bract between the  
scales .....*Pseudotsuga*, Douglas fir
- F. Leaves awl-shaped, or some awl-  
shaped and some scale-like, fleshy  
bluish, berry-like  
cone .....*Juniperus*, juniper
- F. Leaves scale-like, twigs very flattened  
as though pressed, cone dry, not  
berry-like .....*Thuja*, arborvitae,  
white cedar

## SOME COMMON EVERGREENS

### *Pinus* — pine

#### 2-3 needles in a cluster

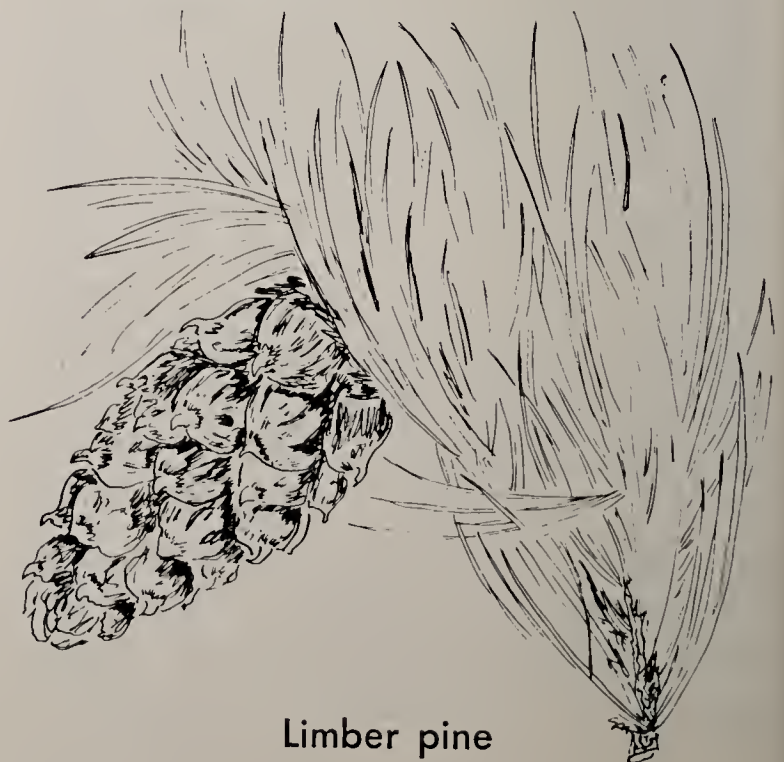
1. Mugo pine — plant shrubby, not  
over 10'-13'. Needles two,  
crowded, stout, 3-8 cm. long,  
bright green. Cultivated, not  
native.
2. Ponderosa pine — native pine,  
forming open forests at lower  
elevations in the mountains. Two  
or three needles in a cluster,  
3"-6" long, yellow-green. Bark  
on young trees black, on mature  
trees in yellowish-brown plates.
3. Austrian pine — needles 3" to  
5" long, dark green, stiff; twigs  
rigid; bark on old trees, dark.  
Cultivated.
4. Scots or Scotch pine — needles  
2"-3" long, twigs flexible, bark  
of branches orange. Shape of

tree open. Cultivated.

5. Pinyon pine — needles about  
1½" long. A small tree with  
cones small and rough with min-  
ute prickles. A native pine often  
planted in Denver.

#### 5 needles in a cluster

1. Bristle cone or foxtail pine. A  
native pine found near timber-  
line or on exposed ridges at lower  
elevations. It is being planted as  
an ornamental in Denver. Nee-  
dles 1½" long, heavy, dark  
green and dotted with specks of  
white pitch. Cone scales have  
bristles or prickles. Cones are  
2"-3" long.
2. Limber pine — a native pine  
found in the same locations as  
Bristle cone pine and also used  
as an ornamental. Needles may  
be 2"-3" long, grayish to bluish-  
green, rather soft and inclined to  
curl. Cones are large, as much  
as 6" long, and are without  
prickles. Branches are smooth,  
light gray and flexible.
3. Eastern white pine — a tree  
planted in Denver as an orna-  
mental. The needles are about 3"  
long, very slender, soft to the  
touch. The cones are large, often  
resin dotted.



Limber pine

*Picea* — spruce

1. Blue spruce — a native spruce found along stream beds in the mountains at elevations of 8000'-8500'. This beautiful tree is widely planted as an ornamental. The needles are 1"-1½" long, stiff, sharp and bluer than any other spruce. The cones are light brown and 2"-4" long. The bark is gray, rough and in ridges rather than scales. New twigs are smooth.
2. Englemann spruce — this is a native spruce forming extensive forests in our mountains. It is also used as an ornamental, although not as commonly as the blue spruce. The cones are smaller. The bark on mature trees is a characteristic cinnamon brown and is in scales, not ridges. New twigs are pubescent, not smooth. Young needles when crushed have an unpleasant odor.
3. Black Hills or white spruce — this is a cultivated spruce not native to Colorado but planted quite frequently as an ornamental. Needles are very short, curved, slender and pale green. Cones are slender, about 2" long.

*Abies* — Fir

1. White fir — a native fir sometimes planted as a specimen tree. The long needles vary from silvery green to dark green. Sprays are noticeably flattened.
2. Alpine fir — a native fir of high altitudes. A narrow, tall tree with needles about an inch long. Branches less noticeably flattened than those of white fir.

*Pseudotsuga* — Douglas fir

This tree is found in association with Ponderosa pine, occurring in moister sites at the same elevations. It can be told from spruce by the flat,



Pinyon pine



Ponderosa pine

petiolate needles and the smooth twigs. The bracts on the cones are unique. They have three prongs which resemble the two hind legs and tail of a mouse scurrying for cover under the cone scale. It is frequently seen in Denver .

*Juniperus* — juniper

Spreading or prostrate, under 6' tall

1. Mountain common juniper — this is a native shrub about 1'-3' high. The awl-shaped needles have a white streak on the side next to the branch.
2. Pfitzer — a commonly cultivated juniper with feathery growth. About 2'-6' tall.
3. Tamarix — cultivated, mounded, seldom over 3' in height.

Erect

1. Rocky Mountain juniper, "Scop" or scopularum. This is the most

common upright juniper in this area. Many ornamental varieties have been derived from this native. Berries are blue or black.

2. Eastern red cedar — this ornamental is similar to the above but has a more open growth and is generally a reddish color in winter. The berries are brownish-violet in color.

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which is Christ the Lord."      LUKE 2:11

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# 1965 Children's Garden Winners

Prizes for outstanding gardens in the 1965 Denver Botanic Gardens Children's Garden project were awarded to the following boys and girls:

## BEGINNERS

1st Place — Debbie Yeager, 1130 York St.  
2nd Place — Donna Stanley, 1061 Steele St.  
3rd Place — Jamie Schopp, 972 Adams St.  
Susan Bailey, 346 Milwaukee St.

## Honorable Mention

Mary Ann Donohue	Debbie Vittetoe
Charles Young	Danny Schopp
Randy Cordova	Roxann Kidwell

## ADVANCED

1st Place — Tia Kawakami, 4916 E. Iowa Ave.  
2nd Place — Mike Edwards 1824 Niagara St.  
3rd Place — Rosemary Martin, 1067 St. Paul St.

## Honorable Mention

Cathy McDonald  
Sheila Kenny  
John Danahey  
Ana Maria Jaramillo  
Nancy Metzger  
Dick Edwards

# Summit Lake Dedication

A DEDICATION ceremony took place on Thursday, September 2, 1965, establishing Summit Lake as a Natural Landmark. The ceremony was conducted under the auspices of the City of Denver Parks and Recreation Department and the National Parks Service.

Summit Lake, nestled high on the north slope of Mt. Evans, is part of the famous Denver Parks System. It was selected for this Natural Landmark designation because of its unique vegetative character. The gently sloping inlet areas with streamlets and bars and the surrounding lake basin are habitats for a variety of rare alpine-arctic plants, some of which occur at the only location outside the Arctic Circle. It has been described by botanists as the best example of Arctic Tundra in the United States. It is located

13 miles southwest of Idaho Springs on State Highway 5, in Clear Creek County.

Its unique botanical value has been known to botanists since the 1880's. It has been a favored place for studies by botanists and naturalists ever since the road was constructed. Dr. William Webber, with the Biology Department of the University of Colorado, has written several papers and made continuous studies of the tundra area for many years. He has requested numerous times in the past that the area be protected from thoughtless visitors who have driven their cars across the tundra area to gain access to the lake. It was he who submitted the original request and data to the National Parks Service to have this area designated a Natural Landmark.

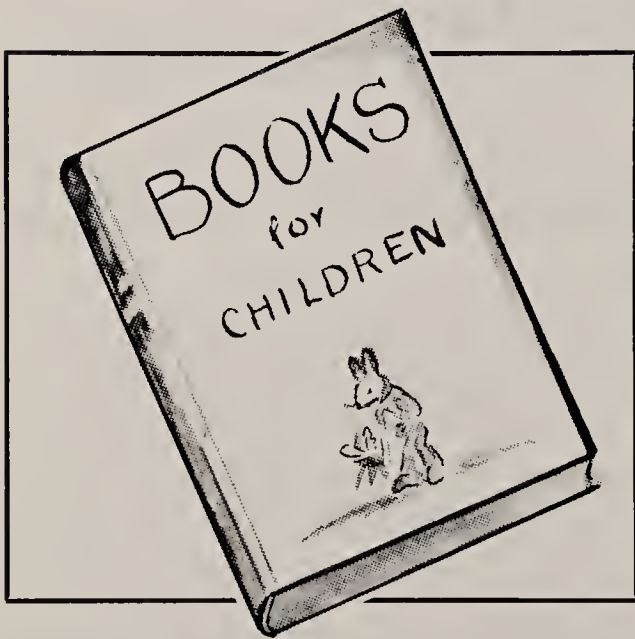
# SHOPPING BOTANICALLY



at the Denver Botanic Gardens Gift Shop



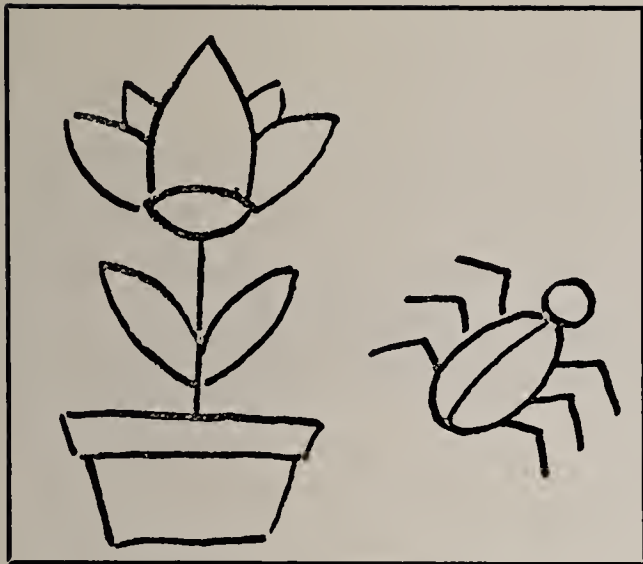
With Christmas coming and the job of finding the right gift for Aunt Tillie still ahead, you are invited to visit the Gift Shop to find presents for her and for other flower-loving friends. Although this shop is small and selection of merchandise is limited by lack of space, 'fun items' seldom found in Denver are available. We wish you a very Merry Holiday Season. SHOP EARLY.



The books available in the shop cover many phases of the botanical world and should whet the mental appetite of young and old, novice and sage. Prices range from \$1.00 to \$12.00. (Special orders for definite Christmas delivery will be taken until December 1st).



To add a lovely touch to your Christmas tree, we offer *Fioral Ornaments*, handmade by the Crafts Committee. These ornaments come in several appealing shapes; they have reflecting backs and clear tops and are filled with tiny dried arrangements. Price: 75¢ each.



To brighten any window on a dreary, winter day, the Talbott Art Studio has produced some *stained glass window hangings*. The gay little objets d'art depict figures from the biological world. Prices range from \$2.50 to \$15.00.



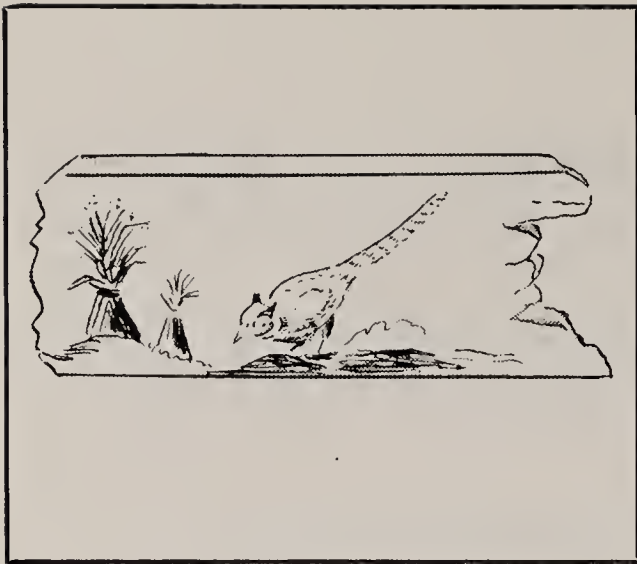
For the flower arranger, the shop has almost everything from floral tape and pin holders to outstanding vases and stands. Also available, in a limited quantity and by special order only, are dried arrangements created by one of the best arrangers in town.



Summer in the mountains remains year around in the lovely *wild flower water colors* by Robin Johnston and *scenic oils* by Susan Ash. Prices range from \$3.00 to \$50.00. Also available, by order only, is a set of wild flower water-colors of the *Official Colorado Conservation List of Wild Flowers* by Joyce Thode at \$35.00 per set.



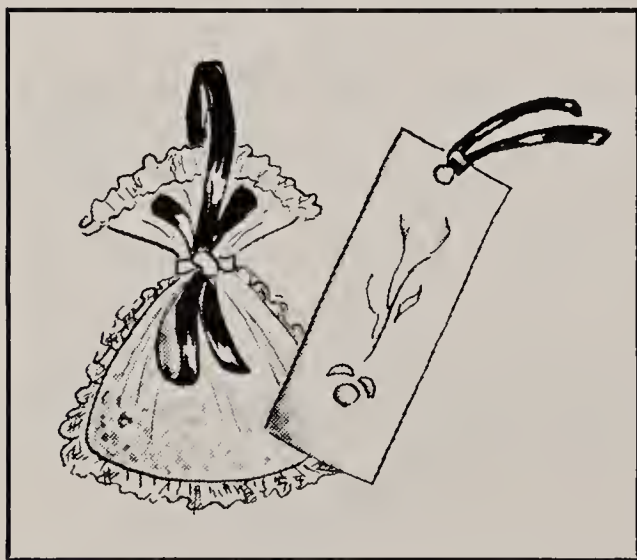
*One-of-a-Kind decorative items* include wreaths, wall hangings and stylized trees incorporating nuts, cones and seed pods. These make beautiful additions to the holiday decor. Prices range from \$5.00 to \$20.00.



For the rustic home, the family room or kitchen, *wall plaques* make wonderful gifts. Susan Ash has painted wild flowers on polished wood. Robin Johnston puts birds, flowers, etc., on driftwood. Prices range from \$1.75 to \$10.00.



No winter yard is complete without birds. Bird experts recommend *wooden feeders* so that the birds' feet will not stick to them when it is very cold. Redwood feeders are priced around \$5.00. A limited supply of feed is available, also.



Unusual small gift items, most of them hand made or hand decorated are found in the Gift Shop. The skilled craftsmen of Gilded Aspen have dipped natural leaves in metal solutions to make attractive pins, earrings and cuff links. The shop also offers note paper, cards, unusual match boxes, sachets, book-marks and napkins. Prices range from 50¢ to \$6.00.



Christmas would lack much of the traditional glow without *candles*. An original idea prompted the encircling of candles with a *candle board* covered with native cones. Only a limited number is available. Prices range from \$2.00 to \$6.00.

# Requisites of Denver Street Trees

GEORGE A. STADLER

GENERALLY, trees growing within urban areas are subjected to many requirements and whims of human associations as well as the basic natural laws of survival. No living tree can withstand extremes which will destroy the capacity to sustain its metabolism.

A growing tree is thus a living entity that survives only in those surroundings which are capable of supplying basic needs in a timely manner. Both hereditary and environmental requisites of different tree species vary greatly. Exceptions may occur even among trees of like species.

A tree's life is dependent upon a continuous coordination of its component parts — underneath as well as above the ground. When any portion of a tree fails in its required function, even for a short period of time, death of living tissues usually results. Many of the fundamentals of their existence are required in a constant manner, others may be intermittent. Some may be extremely variable, bordering on the almost unpredictable.

Constant requirements to be considered for tree growth include the following:

- (1) Adequate composition of soil for root growth.
- (2) Adequate moisture supply.

- (3) Adequate drainage and aeration of soil.
- (4) Adequate space to grow, both overhead and underground.
- (5) Compatible soil and air temperature ranges.
- (6) Adequate exposure to light.
- (7) Freedom from contaminants.
- (8) Protection from virulent disease pathogens.
- (9) Protection from extremes of mechanical injury.

If these "constants" are provided for, the variable requisites of healthy, attractive and safe tree growth then become the chief concern.

Such variables may be:

- (1) Apprehension of insect and disease invasion and timely application of controls and treatments.
- (2) Proper pruning and training of growing structure to provide for healthy tissue, good form and adequate clearances.
- (3) Irrigation to supplement deficiencies of rainfall.
- (4) Addition of fertilizers to supplement soil deficiencies which may occur.
- (5) Timely relief from surface compaction or smothering debris over root zones.
- (6) Prompt and proper treatment of mechanical injuries resulting from unforeseen actions of humans or nature.

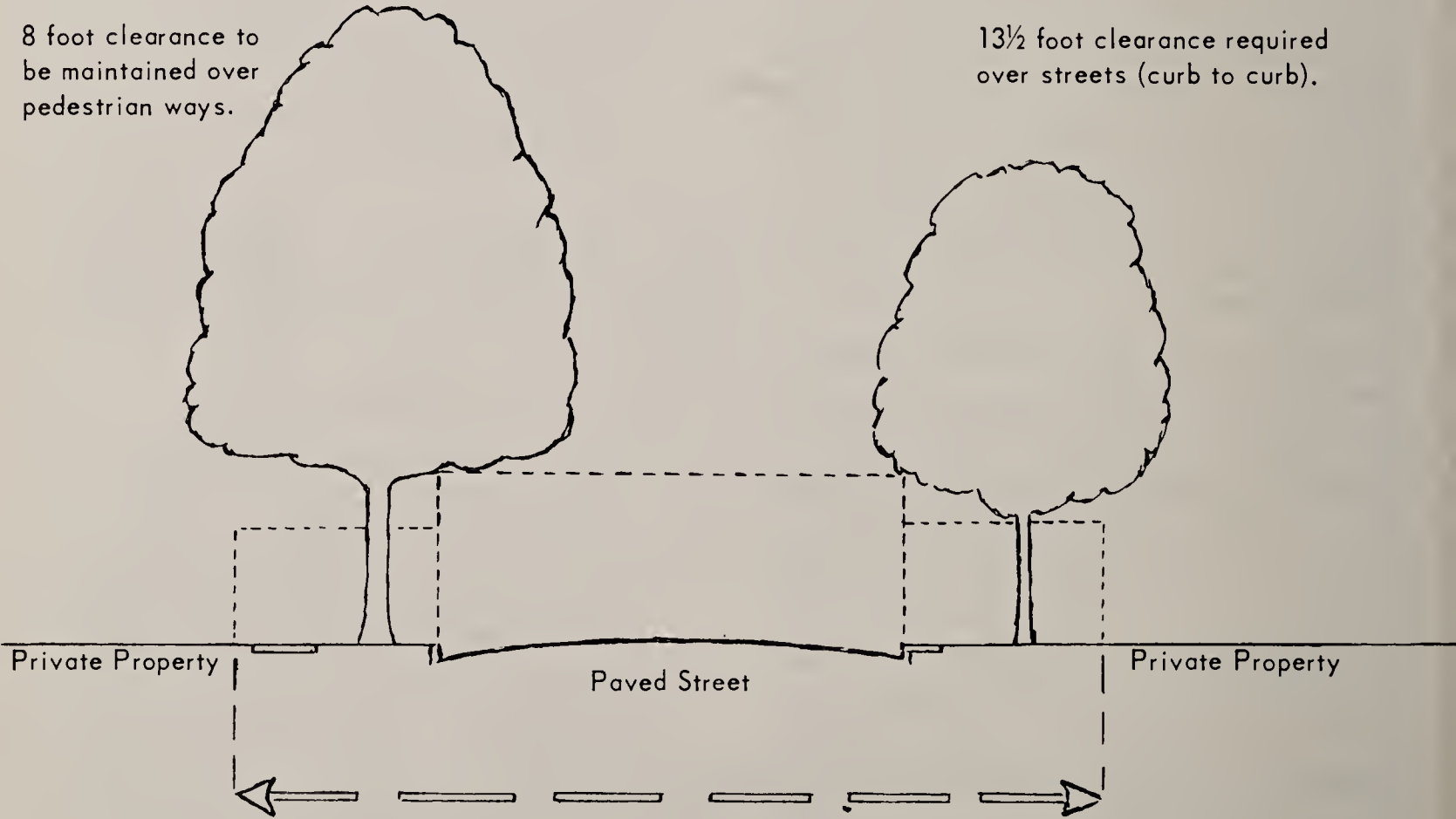


**Buttressing**



**Curbstone damage**

If in doubt as to any municipal regulation concerning planting or care of trees and other plants on the abutting street right-of-way, please call 297-2571 or 297-2578 – City Forester's Office.



**PUBLIC STREET RIGHT-OF-WAY MUST --**  
 provide space for proper installation and functioning of  
 Traffic Signals and Signs  
 Street Lights  
 Overhead and Underground Utilities  
 Bus Stops; Sidewalks; Curbs; etc.

**Clearance diagram**

- (7) Timely release from extremes of excessive competition with other trees, shrubs or plants.
- (8) Cabling and bracing to correct faulty or broken limb structure which may occur following storm damage.
- (9) Protection from lightning in large and older trees subject to damage from same.

These variables must be provided for largely on a "when and if" basis. Failure to take necessary action on a timely basis can result in the loss of the trees involved.

Most trees within the Denver area which are grown in irrigated lawn and garden areas are fairly well catalogued as to basic requirements of growth. Interference and interruption which may result in care of trees along heavily traveled ways must be given consideration in all planting, maintenance or removal activities.

Unless properly programmed and well executed such work can become very restricting to traffic movement, dangerous and costly. Proper planning for street trees should envision those requirements of watering, feeding, pruning, spraying, removing, replacing, or otherwise treating such trees in a safe and economical manner.

Jurisdiction of public rights-of-way bordering streets entails a protection of both overhead and underground public utility structures. These include overhead power and telephone lines, fire alarm lines, traffic signals, street lights, sewer and gas mains, also miscellaneous power and communications conduits and the private service lines taking off therefrom. Sizes, elevations and depths of these public necessities are not necessarily uniform.

Automotive exhaust fumes, carbon and dirt particles accompanied by extremely low humidity are not exactly conducive to healthy tree growth along the edges of heavily traveled streets.

Street widening programs, installations of new traffic signals and street lights, construction of driveway curbcuts and installation of both public and private signs — all have their impact on the well-being of adjacent street trees. Motor vehicle accidents result in an almost constant incidence of injury to street trees. Oversized equipment and loads, including house movers, have a share in the deterioration processes. Street maintenance activities and excavations for installation and repair of underground lines are involved. Augmented voltage loads in overhead electrical transmission lines necessarily require even greater clearances over older and larger trees. The increased use of salt materials for safety on ice covered streets and walks also becomes a portion of the problem.

Both Colorado State Law and Denver Municipal Ordinance demand a minimum 13 foot 6 inch clearance over public streets and roadways. Municipal regulation further stipulates a requirement for an 8 foot clearance over pedestrian walks and ways. Safe passage of automotive vehicles necessitates a reasonably free and unobstructed view of traffic control devices, signals and signs. A reasonable sight distance for safe operation of motor vehicles is an essential.

Trees which are planted and grown in places other than the cultivated lawn and garden usually have a more precarious future than the lawn tree — dependent on timely supplemental moisture supply, ground and air temperatures and the general presence of those ecological factors essential to normal growth. Where trees are established along heavily traveled streets, a short term survival may be predicated upon selection of an adaptable species, proper planting and supplementation of growth requirements.

Impervious pavement or soil surfaces extending up to the base of a tree prevent a normal percolation of both air and water into feeder roots. Openings for trees in pavement or tightly compacted surfaces should be provided which allow for both aeration and moisture supply to growing roots. Only trees of adequate proportions to meet requisites of overhead clearance and desirable appearance, braced to prevent windthrow, are usually considered acceptable for planting in such locations.

Even small open pans or basins, surrounded by impervious surfaces are generally inadequate for larger trees whose fibrous roots seek to extend beyond the vertical line of moisture saturation. In such locations, a dependency on supplemental surface moisture accompanied by poor drainage may result in accumulations of fine fibrous roots just under the irrigated surfaces. Sud-

den and radical temperature changes involving extremes of heat or cold can severely damage such roots. If such roots do grow, adjacent paved surfaces may become broken and cracked. Larger unprotected open reservoirs adequate for water retention and aeration of tree roots, when surrounded by paved surfaces, have been considered unsafe to pedestrian passage unless barricaded or otherwise protected.

The filling of such reservoir spaces with crushed rock or coarse gravel to prevent pedestrians from stepping into them is generally frowned upon by authorities in charge of public ways. Earth fills in such openings around trees usually become muddy when watered and soon compact into impervious masses. Removable metal gratings over the openings in the pavement have been disallowed largely due to current styles of women's high heeled shoes.



**SWINGLE TREE SURGEONS, INC.**

EXTENDS

**Holiday Greetings**

TO OUR MANY CUSTOMERS

*Season's Greetings from the*

**BONSAI NURSERY**

789-2394

3700 S. FEDERAL BLVD.

Victor Tawara



**CHRISTMAS TREES**



*Natural and Flocked*

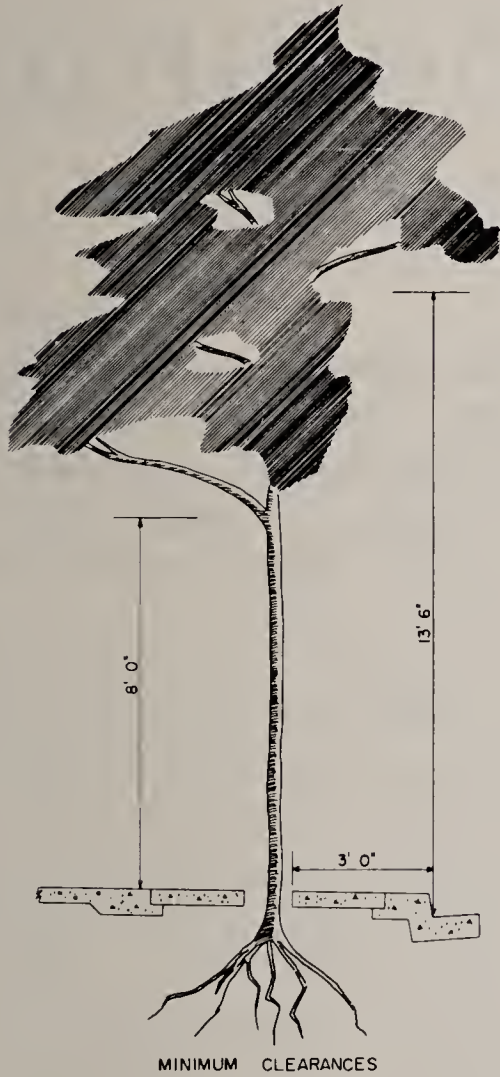
WHITE FIR • LODGEPOLE PINE • PINYON PINE • DOUGLAS FIR • SCOTCH PINE

Wreaths and Roping made to order

Trees in a paved patio also suffer from the above-mentioned difficulties.

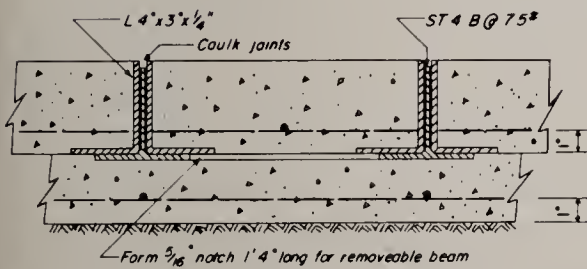
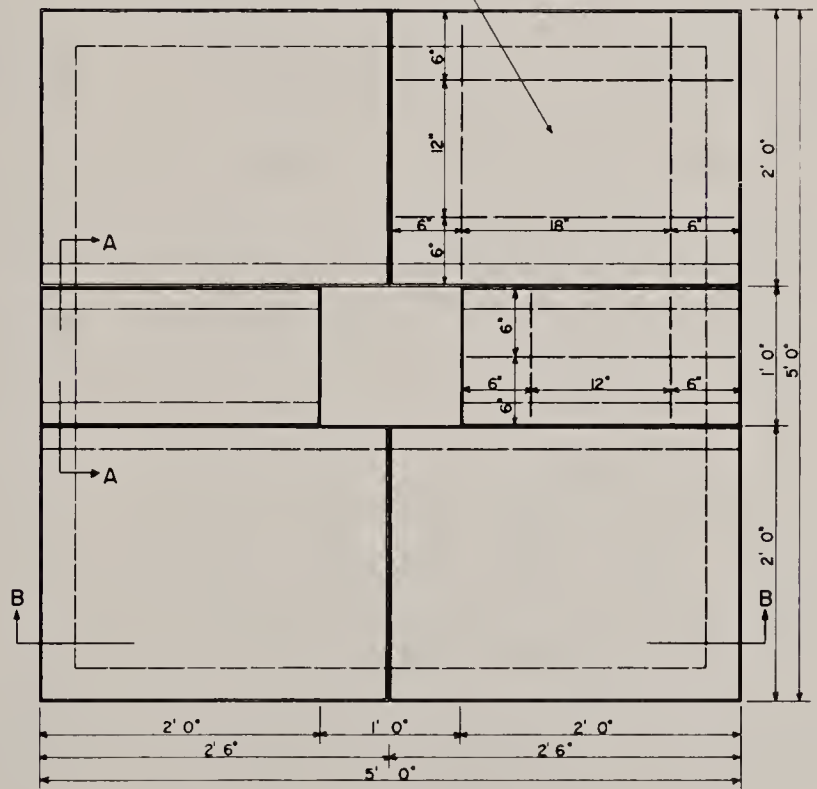
Planting and growing trees in an ecological association of paved surfaces, signals, lights and signs, swarming with people and automotive vehicles and surrounded by abrupt canyon walls of masonry constitutes a relatively unproven procedure in Denver.

The sketch (below) which is a mandate of the Department of Public Works has given a consideration to basic necessities of tree growth under such conditions and appears to be a logical and reasonable manner of meeting both requirements of people and providing space for growing trees in paved sidewalk locations.

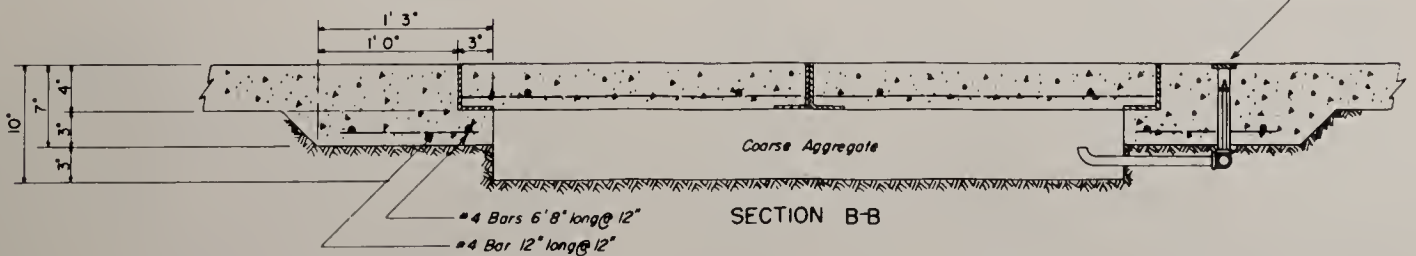


LOCATION, SPACING AND SPECIES OF TREES so planted must comply with requirements of rules and regulations promulgated by Manager of Parks and Recreation.

Typical Slab  
Removeable, Precast Concrete Slabs shall be supported on all sides by L4"x3"x1/4" with #4 Bars welded to frame and spaced as shown



SECTION A-A



SECTION B-B

Submitted

*S. B. Sand* Date 5-18-62  
City Engineer

Approved

*Walter J. Krulich* Date 5-25-62  
Manager of Public Works

# Associates

## First Year Roundup

THE ASSOCIATES of Denver Botanic Gardens summarized its first complete year of service on September 22, 1965, at Botanic Gardens House. At this meeting officers and committee chairmen reviewed the year's activities.

Before the formation of the Associates in September, 1964, eight long-standing committees served Denver Botanic Gardens. The chairmen of these committees are still appointed by the Board of Trustees and serve on the Board of Associates as well. Condensed reports of the treasurer and of the various committees are presented here to give Denver Botanic Gardens members an idea of what the Associates are doing and to stimulate interest in joining the group. These reports are as follows:

*Treasurer*, H. G. Franson. Balance in Treasury, September 3, 1965: \$534. *Income*: Gift Shop — \$2,172. Ticket Sales, 1964-65 Lectures — \$208. Christmas Tea donations—\$112. Other donations — \$130. *Expenses*: Merchandise, lectures, equipment, office supplies, postage, printing, etc.—\$875. *Inventory*: Cost—\$500, resale—\$900. Initial loan from Denver Botanic Gardens repaid — \$500.

*Christmas Tea*: This event was held to announce the opening of the Gift Shop and to promote Christmas fellowship. It was very successful but no profit accrued. There is no tea planned for this year.

*Editorial*, Mrs. William H. Crisp. There has been no committee formed to supplement the work of THE GREEN THUMB Editorial Committee.

*Education*, Dr. Wayne G. Christian. There were five lectures in the 1964-65 series. The 1965-66 series offers six lectures starting September 15. Two bonus lectures, with seating priority going to season ticket holders, features a talk on orchids by Hugo Greipl and a repeat of Dr. Anderson's illustrated lecture on "Colorado Wild Flowers." Both of these will be presented at Botanic Gardens House with attendance limited to 60 persons.

*Education Courses*, Joseph W. Oppe, Botanist-Horticulturist, formerly associated with Denver Botanic Gardens, conducted a six-weeks course entitled: "Basic Botany," followed by sessions on "A Review of the Plant Kingdom."

*Flower Arrangement*, Mrs. R. M. Kosanke. More than 50 arrangements

were prepared for decorating Botanic Gardens House during the year. This committee's function is to prepare such arrangements rather than teaching the art. There are other organizations engaged in teaching arranging.

*Garden and Home Show*, Mrs. Earle Honnen, Mrs. Charles Arnold. A booth representing Denver Botanic Gardens was prepared in the manner of a rooftop garden with the assistance of Mr. Chris Moritz, professional landscape designer. Materials were obtained through donations and through purchases. Construction work was handled by City and County trained personnel. Members of the Associates staffed the booth.

*Gift Shop*, Mrs. Bern Neil for committee. Shop was opened at Christmas Tea. Mrs. Irene Freeland, Chairman, and Mrs. Lawrence Bucher, bookkeeper. Both resigned early in 1965 because of other business. Mrs. Chard Smith assumed the chairmanship and formed a committee with Mrs. Jelstrup as bookkeeper. Policy: At monthly meetings, appointed buyers bring suggested items for resale. These are evaluated and each item is voted upon for purchase, consignment or rejection. Merchandise accepted by vote may have a maximum return of 66 $\frac{2}{3}$ % to the consignee. The shop has been staffed by hostesses in Botanic Gardens House.

*Arts and Crafts* subcommittee, Mrs. J. P. Steele, Jr. The group has met during the year, preparing gift items at a minimum of expense and maximum of fun and a good percentage of profit. Workers are encouraged to join this group, which meets at the House at 10:00 a.m. on the first Thursday of each month. Bring sack lunch, ideas, and work as late as you wish. Items are especially needed for the Christmas rush.

*Guided Tour Program*, Mrs. Charles L. Saunders, original chairman, has resigned because of a move to another state. Mrs. J. D. Sawin assumed responsibility. Approximately 1,000 persons were given guided tours of the York Street Unit since the introduction of this service. Tours by appointment were conducted for 13 school units, 18 garden clubs, 8 service groups such as Scouts, Camp Fire Girls, 4-H Clubs, and Senior Citizens. Also, tours were scheduled for six special education groups including mentally retarded and sanatorium patients. Dr. Hildreth, Director, gave three training programs for volunteer guides in late summer of 1964 and one in early summer of 1965. Other guides were recruited from Mr. Oppe's Botany classes.

*Hostesses*, Mrs. C. H. Tempel, Mrs. A. A. Bowser. Hostesses to greet visitors and staff Gift Shop were provided throughout the year. The number of hostesses must be doubled to staff the Gift Shop for entire week when it is moved to the conservatory upon its completion.

*Herbarium*, Dr. Helen M. Zeiner. The work of sorting, classifying and labeling dried, native plant material has been continued throughout the year. Educational displays of cones were arranged during winter months and will be continued if suitable display space is found. Mrs. W. B. Ash prepared plastic-laminated signs for the M. Walter Pesman trail on Mt. Goliath. One high school class visited the herbarium for a tour and talk.

*Library*, Miss Lucy M. Crissey. The committee processed gifts of books from collections of Dr. Fulling, Mrs. Kalmbach, M. Walter Pesman and the Colorado Cactophiles. There were numerous other single donations also processed. The Library Fund is very low and the question of additional sup-

port for purchase of books and working materials is before the Finance Committee. Volunteers staff the library 4 days a week.

*Maintenance, City Park Rose Garden*, Mrs. H. G. Franson. A dozen volunteers donated more than 70 hours to cut dead blooms and to weed. An inventory was made of bushes and varieties grown and assistance given in selection of new roses. They supervised planting of 330 new bushes. Many more volunteers are needed.

*Maintenance, York Street Unit*, Mrs. R. L. Davis, Mrs. Earl Wilson. Letters were sent Associates possibly interested in this project. Work projects were listed on bulletin board and crossed off when completed. More workers are always needed as Mrs. Barr has been practically alone in carrying on this work.

*Membership*, Mrs. William Stanley. Committee formulated a plan to establish a speakers' roster for illustrated talks on the importance of membership in Denver Botanic Gardens. Active work will proceed after completion of Horticulture Hall Fund Drive.

*Plant Sale*, Mrs. G. B. Morrison, Mrs. Theodore Washburne. The 1965 Plant Sale, May 7, 8 and 9, was outstanding. Its purposes are to acquaint the public with Denver Botanic Gardens and its facilities and to offer choice plants for sale which are not all easily available. The sale netted about \$5,300. About 150 volunteers, Associates, members of the Colorado Federation of Garden Clubs, Inc., and independent garden clubs, Denver Botanic Gardens Guild, Around the Seasons Club, Men's Garden Clubs, Swingle Study Group, plant societies and individual plant enthusiasts united in this effort.

*Promotion*, Mrs. Chard P. Smith, Jr. Letters and announcements were sent

to garden clubs, nurserymen, schools and colleges. Articles were written for THE GREEN THUMB. Publicity releases for news media were sent to White & White, Inc.

*Terrace and Garden Tour*, Mrs. R. A. Kirk, Mrs. Charles Saunders. Sponsored by Denver Botanic Gardens. The tour on June 23 produced a profit of \$2,000, which was turned over to Denver Botanic Gardens. Members of the Associates assisted wherever requested.

*Tree Tours*, self-guiding, Mrs. William H. Crisp, Mr. Earl Sinnamon. Tree lists of the eastern sector of City Park were completed prior to preparation of permanent labels for individual trees. Outlines of 3 tours were prepared for use in studying trees.

*Manager*, Mrs. Chard P. Smith, Jr. Supplementing these reports, I would like to comment that I believe it has been a good year. However, we are a long way from the fully-staffed, efficient group we hope to be. Within a year and a half we have grown from a nucleus of 8 people to an organization of 130 workers. There have been mistakes made but things have been accomplished never before attempted: the Christmas Tea, Guided Tours, Maintenance, Lectures, Gift Shop, Flower Arrangements, Hostessing and help to the long-standing committees of Denver Botanic Gardens.

May I congratulate the incoming officers? Finally, a word to volunteers, of which I am one: I sincerely hope that you will support these officers to the best of your abilities. I hope that you will hound the chairman of the committee for which you wish to work until you are settled in an appealing job which will keep you busy. The time you can give may be much or little as long as you do the job you say you will so that we may depend upon you.

# A Denver Botanic Gardens MEMBERSHIP *Makes the ideal Gift*

DENVER BOTANIC GARDENS, 909 York St., Denver, Colo. 80206

I hereby apply for membership in the Denver Botanic Gardens

I wish my membership in the Denver Botanic Gardens extended

Enclosed is \$..... for my annual dues.

Class of Membership desired: (check one)

- |  |          |   |         |
|--|----------|---|---------|
| <input type="checkbox"/> Regular .....       | \$ 5.00  | <input type="checkbox"/> Supporting .....   | \$25.00 |
| <input type="checkbox"/> Participating ..... | \$10.00  | <input type="checkbox"/> Contributing ..... | \$50.00 |
| <input type="checkbox"/> Sustaining.....     | \$100.00 |   |         |

Name .....

Address .....

.....  
City State Zip Code

Recent photograph of conservatory  
now nearing completion.



# Denver Botanic Gardens

## OFFICERS

MR. LAWRENCE A. LONG.....*President*  
DR. JOHN R. DURRANCE.....*Vice-President*  
MRS. JAMES J. WARING.....*Vice-President and Assistant to President*  
MRS. GEORGE H. GARREY.....*Vice-President and Assistant Secretary*  
DR. MORAS L. SHUBERT.....*Secretary*  
MR. JOHN C. MITCHELL.....*Treasurer*

## BOARD OF TRUSTEES

### *Ex-Officio Members*

Mayor Thomas G. Currigan  
Mr. Ben C. Essig  
Mr. Hudson Moore, Jr.  
Mrs. Thomas P. Currier  
Dr. William E. Morgan

### *1966 Term*

Mrs. James R. Arneill, Jr.  
Mr. J. Clinton Bowman  
Mrs. Brown W. Cannon  
Mr. Andrew Horan, Jr.  
Mr. John C. Mitchell  
Dr. Moras L. Shubert  
Mrs. James J. Waring

### *1967 Term*

Mrs. Alexander L. Barbour  
Mrs. Ed H. Honnen  
Mr. Everett C. Long  
Mrs. Frank McLister  
Mr. Aksel Nielsen  
Dr. Robert L. Stearns  
Mr. Herbert von Bergen

### *1968 Term*

Dr. John R. Durrance  
Mrs. George H. Garrey  
Mrs. Jess Gibson  
Mr. Lawrence A. Long  
Mr. Hudson Moore, Jr.  
Mr. Kenneth G. Wilmore

## EXECUTIVE COMMITTEE

Mrs. George H. Garrey  
Mrs. Ed H. Honnen  
Mr. Lawrence A. Long  
Dr. John R. Durrance

Mrs. Frank McLister  
Mr. John C. Mitchell  
Mr. Aksel Nielsen  
Mrs. James J. Waring

## BOTANIC GARDENS GUILD

Mrs. James Dyer, *President*

Mrs. Robert L. Davis, *Vice-President*

## AROUND THE SEASONS CLUB

Mrs. Frank O. Brown, *President*

Mrs. Hayes Neil, *Vice-President*

## ASSOCIATES OF DENVER BOTANIC GARDENS

Mrs. Graham B. Morrison, *Manager*

Mrs. Robert Kosanke, *Assistant Manager*



*B*EST WISHES FOR A  
JOYOUS HOLIDAY  
SEASON

To All Members of  
Denver Botanic Gardens  
and  
Advertisers in  
The Green Thumb

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### TROPICAL PLANTS

Plant Trails of Denver Botanic Gardens

### WILD FLOWERS

See Native Plants

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A Publication of Denver Botanic Gardens

VOLUME 23, NUMBER 1

JANUARY - FEBRUARY, 1966



THE COVER

*Pinus edulis* Engelm. in Wisliz.,  
Mem. North. Mex. 88. 1848.  
Pinyon or Nut Pine

*THE GREEN THUMB*

VOLUME TWENTY-THREE, NUMBER ONE

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# The Green Thumb

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HELEN M. VINCENT, *Editor*

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# The Importance of the Botanic Gardens to Metropolitan Denver

HUDSON MOORE, JR.

"WHEN WE think of the great civilizations and the outstanding cultures of history, we are inclined to think of their great centers of learning, their accomplishments in the fields of art and music and their scientific endeavors. But this is by no means the complete story. With the rise of civilizations and the strengthening of their cultures there has come a developing search for knowledge of, and an interest in, living plants, trees and shrubs and a desire to know more about where and how they can be made to live, to grow and to prosper. The eternal serenity that the cultured man invariably has found in living plants universally has been characteristic of the development and progress of man himself.

"A collection of such living plants began to be referred to as a botanic garden, and the original conception of a botanic garden was that literally implied by the name, that is, a garden with the plants arranged according to some system of botanical classification.

A botanic garden thus differs from a park where the plants are usually arranged solely with reference to securing a beautiful landscape effect. The primary purpose of a park, moreover, is recreation, while that of a botanic garden has always been that of science and education. In time, however, these institutions developed along broader and more inclusive lines and a botanic garden is now properly defined as a "scientific and educational institution whose purpose is the advancement and diffusion of a knowledge and love of plants."

"One of the first gardens developed for the express purpose of facilitating the study of plants was that of Aristotle, the great Grecian philosopher, an ardent student of plants, who also wrote books on botany. Aristotle's botanic garden in Athens was in the custody of his pupil, Theophrastus, who fell heir to it on the death of the master. It would thus appear that, in modern terminology, the first patron of botany of whom we have record was

Aristotle, about 350 B.C., at the height of the Grecian empire. And the first "director" of a botanic garden was Theophrastus, who also wrote books on botany and, I suspect, may have even published a *Green Thumb*.

The history of botanic gardens from that time until the 15th or 16th century has not been traced in detail, but, progressively, as the status of nations and countries advanced, the quest for scientific knowledge and expression of love for living plants equally moved forward.

"The botanic gardens of Pisa, Italy, established in 1543, were amongst the earliest gardens devoted to the public study of botany and became famous for the establishment of modern systematic botany. They influenced botanical science for over a hundred years.

"The botanic garden of Paris, France, was established in 1635. The Chelsea Garden in London, England, was established on the banks of the Thames in 1673 for the express purpose of advancing the teaching of botany and of providing study material for research and teaching and enjoyment derived from living plants.

"The Berlin Botanic Garden was established in 1679. Its conservatories contain a remarkable collection of tender and tropical plants. Near London, England, the Royal Botanic Gardens were established at Kew in 1759. These gardens stand in relation to botanical science much as Greenwich does to astronomy. The gardens at Kew have had a profound effect upon the entire British Empire, distributing to new centers bread-fruit, pineapple, banana, coffee, cocoa, rubber, various fibers, timbers, dyes, quinine and other drugs. The quinine plant was introduced by Kew from South America to India in 1860 as a specific for malaria and, undoubtedly, much to the pleas-

ure of the Empire servants with their evening gin and tonic. Most of the natural crude rubber of the world is derived from the Para rubber tree raised from seeds collected by Kew in Brazil in 1875. The Kew Gardens maintain a school of horticulture. The gardens are visited by more than a million people annually.

"Other important European botanic gardens are found in Amsterdam, Budapest, Cambridge, Copenhagen, Genoa, London, Leningrad, Madrid and Rome. In Asia and the Pacific Islands botanic gardens of note are found in Tokyo, Calcutta, Java, Hong Kong, Ceylon, Melbourne and Tasmania; in Africa at Capetown and in South America at Rio de Janeiro and Buenos Aires. In the United States, the first botanic garden was established near Philadelphia in 1728 by John Bartram. Here he planted and studied many native American plants as well as exotics obtained from European botanists. In America, perhaps our first public botanic gardens were established in Washington, D. C., as the United States Botanical Garden in 1850, occupying about thirteen acres near the Capitol grounds.

"The next garden in this country was established in St. Louis in 1859 as the Missouri Botanical Gardens which are known locally as "Shaw's Gardens," from the name of the founder, Henry Shaw. The founder's will provides that there must be preached annually a sermon on the power, wisdom and goodness of God as shown in plant life. This garden has recently completed a geodesic, dome-shaped, plexiglas-covered greenhouse, erected at a cost of \$700,000, known as a Climatron because of its unique dual air-conditioning systems for duplicating many climatic conditions.

"In 1872 the Arnold Arboretum was

established in Forest Hills, near Boston, as the living tree museum of Harvard University, occupying an area of approximately 250 acres. (An arboretum is a special kind of botanic garden devoted only to woody plants, trees, shrubs and woody vines). A fine library of 40,000 volumes and 10,000 pamphlets is part of this project which is partially supported by an endowment of \$2,000,000.

“In 1894 the New York Botanical Garden was established in Bronx Park, New York City, comprising an area of 400 acres, having two large conservatories, a lecture hall and a library. It has an endowment fund of \$2,400,000. Courses of free public lectures are given throughout the year, and the garden is supported by both municipal and private funds.

“In 1910 the Brooklyn Botanic Garden was established in Brooklyn, New York. This garden has an area of about 50 acres, and its work covers anything scientific or educational based upon plant life. Its educational program is perhaps more extensive than that of any other botanic garden. The garden is supported both by municipal funds and by private gifts and grants. The trustees have stated that this coupling of municipal support with private enterprise makes for the freedom and flexibility of private operations, yet gives basic support that is essential. It also permits the botanic garden to render a service to the people of the city that could not be offered if either the city government or the private corporation were to operate it alone — which is so true here in Denver.

“No such brief accounting of the history of botanic gardens would be complete without mentioning the Longwood Gardens at Kennett Square, Pennsylvania. They were built by Mr.

Pierre S. DuPont and opened to the public after the conservatory was completed in 1921. This conservatory provides the ultimate in horticultural display. Approximately 3½ acres in extent, it provides a year-around display of the choice varieties of well-known plants as well as a collection of the finest ornamentals of tropical and sub-tropical climates to be found in this country. One typical exhibit is the orchid display which is drawn from a collection of more than 5,000 orchid plants. The display is changed twice a week and is always kept in excellent condition.

“Finally, in 1948, Los Angeles County in California realized that it was the only major metropolitan area in the United States which lacked a botanic garden or arboretum. A 127-acre arboretum has now been built within short driving distance from downtown Los Angeles.

“Through this brief history of man’s continuing quest for knowledge about living plants, his enjoyment of them and the educational opportunity to learn more about them, there runs one stark fact from our point of view. From St. Louis on the east to Los Angeles on the west and from Fort Worth on the south to Leningrad, Russia, on the north, there is no other botanic garden or arboretum other than our present effort here in Denver.

“Why has this been so? To answer this, we must turn back the calendar to 1841 when the United States Congress wanted to know more about this rugged country and commissioned an army engineering officer, Major Long, to make a study and report upon this area. Major Long, having made this study, concluded the report about his findings with this statement: “This country is suitable only for prairie dogs and rattlesnakes and is wholly

unfit for human habitation.”

“This was due to one thing — water — or the pitiful lack of it. Major Long could see for himself that the scant supplies on the eastern slope of the Rockies would soon be exhausted by any degree of population and, based upon the engineering techniques of that day, it was impossible to pierce the continental divide.

“So, a mountain peak was named after Major Long — Long’s Peak — for his foresight and forecasting ability. There was only one thing that the Major did not take into account; the character and tenacity of the people who would come and try to inhabit this desolate waste and perhaps make a mockery of his report on the area.

“In 1918 it was realized by area residents that, if Major Long were to be proved wrong, it would require the total resources of this entire community to meet and overcome the water dilemma. Therefore, the City of Denver acquired the municipal water system, putting behind it the entire financial resources of this city. Yet, for the next forty years, during more than half of the time, this community was faced continually with water restrictions, limitations and denials upon the use of this most essential commodity. The year of the great drought arrived — 1954 — when this community was down to less than 5 months reserve supply of water. Plans were being made quietly for the possible adoption of martial law, if necessary, to support an edict that water could be used only for human consumption. All lawns, trees, shrubs and flowers would do without water. However, for 6 years prior to this time several thousands of men had been working tirelessly to meet this possible catastrophe; approximately 150 million dollars were being poured forth by this relatively small

community in an all-out effort to survive the drought when the tide began to turn. Reservoirs, collection systems and tunnels began to emerge. The continental divide was pierced, not once but four times, culminating in the holding through of the longest water tunnel ever drilled in the history of man: the twenty-three mile long Harold D. Roberts Tunnel. Mr. Roberts was a brilliant lawyer whose hobby was the identification and photographing of native Colorado wild flowers, and he willingly and knowingly shortened his life because of his intense efforts to overcome the water shortage. Our problem was solved.

“Today, with many cities elsewhere in America in a desperate situation caused by lack of water, Denver, for the first time in its history, has adequately and fully solved this problem.

“Now, what are we going to do with this precious asset? Most assuredly, we and our children and our children’s children are going to build one of the great cities of the times. Our universities, our libraries, our parks, our climate, our mountains, our museums and our botanic gardens are going to be those resources that make Denver more than just a city — it will be the jewel of this area for which Major Long had so little regard.

“What could be a finer tribute to a city and a civilization carving its way of life out of a near-desert environment than to build a botanic garden with a bountiful display of living plants speaking in their way in tribute to this magnificent accomplishment?

“A fine botanic garden must, of course, have a collection of living plants, out-of-doors and under glass, but the modern institution should possess, in addition, an herbarium, a library, laboratories, class rooms and lecture halls. The housing for a fine

collection of living plants is being magnificently provided for at Denver Botanic Gardens by the gift of the Conservatory from the Boettcher Foundation. This has been provided as a memorial to the man and his wife who were most instrumental in the creation of that splendid Foundation. The gift stands, in itself, as an excellent example of the working of the private enterprise system in America in its finest sense: the right of the individual to succeed through his own efforts and the opportunity given that individual to put back into his community a major portion of the fruits of his efforts.

“There is one more row to hoe — the construction of Horticulture Hall.

When this has been accomplished and the citizens of the area look with pleasure and satisfaction upon what they have helped to bring into being, the reward will be just the same as that which Aristotle received so many times when speaking of his beloved City of Athens — to be able to say with justifiable pride: “I, too, am a Citizen of Denver.”

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The foregoing material is excerpted from a speech delivered by Hudson Moore, Jr., to the members of the Corporate Division of the Horticulture Hall Fund Raising Campaign. Mr. Richard Kirk is chairman of this division.

Mr. Moore is a member of the Board of the Denver Museum of Natural History. He is a charter member of the Denver Botanic Gardens Board of Trustees. (EDITOR)

# PINYON PINE

## IN COLORADO

*Pinus edulis* is widely distributed in Colorado coming to the south and west from Utah, Arizona and New Mexico, extending to Wyoming on the north and to Owl Canyon near Fort Collins on the east. Specimens found at Owl Canyon are perhaps the finest in the world with one patriarch about 25 feet high, crown spread of 31 to 37½ feet and trunk circumference of 11 feet. The forest service estimates the tree's age between 600 and 800 years. The pinyon is not seen in the foothills near Denver and never grows in the higher mountains.

Pinyons, the smallest of our native pines at maturity, are slow growing, drought enduring and exceedingly adaptable to landscape use in this area. The wood makes excellent fuel, burn-

ing with a pleasing aroma.

Needles from the pinyon pine are 1 to 1½ inches long, have prominent white stomatic lines on the under side and grow two or three needles in a cluster.

The cones are without prickles on the scales and seeds leave large cavities in the cones when they drop. Mature cones are flower-like when open and are also attractive on the reverse side.

As is well-known, the Colorado pinyon pine has edible nuts prized by native Indians, early settlers and present-day confectioners. Nearly ½ inch long, this heavy seed has a thick seed-coat enclosing the meat part, within which at the very center lies the embryo or young plant.

# House Plants

HELEN MARSH ZEINER



Double Fibrous Begonia, Park's 'Jewelite'

RAISING house plants can be a very pleasant and rewarding hobby. It is unfortunate that some people find raising house plants frustrating. The “green thumb” of house plant care is within the reach of everyone — it simply means having a regular schedule of care for your house plants, having some understanding of their needs, and always keeping in mind that house plants are *living* things and must be treated as such.

If you are an amateur, if you have been having bad luck with plants, or if you are a very busy person, choose easy-to-grow plants. There are a number of these easily obtainable and they are very attractive plants. As you become more proficient or have more time, turn to plants which are more exacting in their requirements. A list of easy-to-grow and moderately easy-to-grow plants will be found at the end of this article.

Many house plant troubles stem from poor watering habits. Over-watering and erratic watering are the greatest

faults. You should make it a point to have a regular time to check your house plants. Ideally, this would be once a day, or at least every other day. It takes only a few minutes to check whether or not water is needed. Only those plants which are dry or which would appear to be too dry before the next check period should be watered. Experience will soon tell you whether or not the soil is dry. The easiest and best test is simply to feel the soil which will be dry, moist or wet.

Not all plants will need water at the same time. The kind of plant, the kind of pot, the size of the pot and the location in the room are all factors which affect watering needs.

When you water, use enough water to thoroughly saturate the soil but do not use so much that the plant is water-logged. Normally moist soil contains some air which is necessary for the well-being of the plant; water-logged soil has no space for air.

It makes little difference whether you water from the top or from the



*Ficus* (Rubber Plant)

bottom. Each method has advantages and disadvantages and an alternation of methods is sometimes helpful.

If you are bottom-watering, set the pot in a container of water and let it stand until the top of the soil is moist. Then remove the pot from the container of water or pour out surplus water if the pot was watered in its pot saucer. The danger of bottom-watering comes from letting the pot stand in water after the soil has taken up all the moisture that it can hold. When surplus water is allowed to drain away, this is an excellent method.

If time permits, you may wish to put all of your plants in the bathtub and give them a thorough bottom-watering about once a week. For many of them, this will be the only watering need.

In top-watering, be sure to use enough water to moisten all the soil in the pot. If water seeps out the drainage hole, this usually indicates you have used enough. However, be sure that the water did not simply run down between the ball of soil and the side of the pot. Avoid splattering water on the leaves, since drops of water can act as lenses in

the sun and burn spots on the leaves. Also avoid getting the crown of the plant wet. Some plants have a tendency to crown rot if water stands in the crown.

Generally speaking, plants in ceramic or metal pots will not need watering as frequently as those in clay pots. It is easy to overwater plants in these pots, especially if they lack drainage holes, so use care.

At the same time that you water your plants, give them a quick check to see that no insect pests have found their way into your home. Note whether there are any spotted or dropping leaves which are often a sign of too much water or poor drainage.

You should have very little trouble with insect pests, but occasionally you may find red spider or mealy bug. Both of these are easily controlled when they first appear. Red spider may be recognized by dry, discolored undersides of leaves, which may be webby and which may have tiny specks of black on the webs.

Usually a thorough washing with naphtha soap will control red spider.



Palm

If it does not, use black leaf 40 or malathion according to manufacturer's directions.

Mealy bugs appear as tufts of cotton in the axils of leaves. Touch each with a swab dipped in rubbing alcohol or if the infestation is heavy, spray with one of the above mentioned sprays.

Frequent spraying or washing of leaves on house plants is a good preventive measure so far as insect pests are concerned. It also removes dust and keeps the plant attractive. Another benefit is that frequent washing or spraying of leaves compensates somewhat for the lack of humidity in the air in most homes.

Since most house plants are natives of the tropics, they are used to high humidity. Houses in general are low in humidity and this is especially true in the west. Anything that can be done to increase humidity is beneficial to house plants. In addition to spraying the leaves, we can grow them on pebble-pans, which are simply containers filled with pebbles and water, the water-level being kept below the base of the pot. It is also helpful to grow some plants in water, which will evaporate into the air and increase the humidity in the vicinity of the container.

Remember that all green plants need light. Light is the source of energy used by green plants in photosynthesis. Only plants which lack the green pigment, chlorophyll, and are therefore unable to make their own food, can live without light.

Green plants differ in their light requirements. Generally speaking, flowering plants need more light than foliage plants. A plant grown without sufficient light cannot be healthy or attractive.

It is often possible to use plants in poorly-lighted parts of a room if you are willing to take the trouble to move

them to a well-lighted location for a few hours a day. Artificial light may also be used to solve the problem of using a plant in a location where there is not enough natural daylight.

Signs of too little light include weak, pale-green, elongated stems and thin, succulent-looking leaves. Failure to bloom may be due to insufficient light.

Plants may also be exposed to too much light. Bleached, yellow leaves on a plant close to a window may indicate that chlorophyll has been destroyed. Using a sheer curtain between the plant and the glass may solve this problem.

Since plants in the home usually receive light from one side only, they should be turned now and then to keep them well-shaped.

A good potting soil is necessary if you wish to be truly successful with house plants. Since they grow in a very restricted area in a pot, they need all the help we can give them and good soil is essential. Soil not only supports the plant, it provides it with certain nutrients and is the carrier for the water which the roots absorb. It should be friable and easily penetrated by roots and should not become compacted and hard.

If you have many house plants, you may wish to make up a quantity of house plant soil which will keep indefinitely and will be available whenever you want it. A very satisfactory potting soil for this area where soils tend to be heavy is made up of one-third loamy soil from the garden or border, one-third peat-moss and one-third coarse sand. Compost or leaf mold may be substituted for the peat and vermiculite or perlite for the sand. This soil is suitable for most house plants. For others, you may increase the peat or the sand as necessary.

For the person who has few plants,



A Pleasing House Plant Display

the commercially prepared potting soils are very satisfactory.

A plant potted in fresh soil should not need fertilizer. However, after it has grown in the same soil for some time, addition of fertilizer is beneficial. If a plant is making no new growth, although it is not dormant, or if it is stunted or the new leaves are small and pale, it needs to be fed. Most people will find commercial fertilizers very satisfactory and convenient. There are a variety from which to choose, so shop around and find one that suits you.

About once a month is often enough to feed most house plants. Follow manufacturer's instructions as to strength and never apply more than indicated.

In choosing pots, you will find a wide variety available. Prices range from a few cents to several dollars and by browsing through the stores you can find attractive pots to fit any budget.

From a cultural standpoint, the old-fashioned clay pot is best. Since these pots are porous, aeration and evaporation can take place through the sides of the pot. For the amateur grower, these pots are first choice simply because it is easier to grow plants well in them.

If possible, always select a pot with a drainage hole in the bottom. If the pot you choose has no drainage hole, be sure to put a good layer of pebbles or broken clay pot as drainage material in the bottom and use care not to over-water.

Plants need to be repotted when they have outgrown a pot or when they are potbound or rootbound. To determine this, slip the plant out of the pot and examine the condition of the root system. If the soil is moist, it is easy to slip the plant from the pot by holding the stem between two fingers, tapping the side of the pot on a table edge and gently slipping the plant out, soil and all. If it is potbound, the roots will

have grown until they cover the ball of soil. If they are white and healthy, do not disturb, but simply repot the plant in a size larger pot. If they are brown and discolored, loosen them and cut off those which seem dead. Pot the plant in the same pot from which it came and cut back the top to make up for loss of roots.

Some plants bloom best when a little potbound. If the roots are healthy, a plant can be kept without repotting for a long time by the addition of fertilizer and general good care.

For shapely house plants, do a little careful pruning and pinching back of tips. Any branch pruned off should be cut at a joint so that no ugly stubs are left. Pinching back tips encourages branching. Just as soon as you can see the tiniest bud appearing, pinch it out. If done early enough, the scar will not be noticeable. Branching usually takes place below this point. The difference between a scraggly, leggy geranium or coleus and a compact bushy one depends on keeping the plant pinched back. The process should start when the plant is young and only a few inches high.

When choosing houseplants, keep in mind the place where you wish to keep the plant and try to choose one which will stand the conditions in its proposed location. This is much easier than trying to alter conditions to suit the plant. Generally speaking, plants should be near a window, and, if possible, in a cool part of the house.

The following plant lists should be of help to you in selecting house plants:

#### **EASY-TO-GROW PLANTS**

*Syngonium*—tri-leaf wonder—This plant has three-parted leaves when young. Old plants have leaves with five divisions. Leaves are variegated green and silver. This plant will do well with

indirect light. It can be grown in soil or water. It should be watered well and then permitted to dry out before watering again. It is easily rooted in water.

*Peperomia* — peperomia — There are several easy-to-grow available, but the old favorite, *Peperomia obtusifolia*, is very good for the amateur grower. Peperomias tolerate various light conditions but prefer indirect light. They must have good drainage and should never be kept constantly wet. Let them dry out between waterings.

*Philodendron*—devils ivy—This old favorite, vining philodendron with its heart-shaped leaves, is a very tolerant plant which should give good results under most house conditions. It can be grown in water or soil and is very tolerant of a wide range of light conditions. As older leaves drop off, cut off the stems and re-root in water or in moist soil.

*Sansevieria*—mother-in-laws-tongue, sword plant — These plants are very tolerant and will stand extreme abuse. Young plants are very attractive. When they become too large, they can be re-rooted. Dwarf forms which make low rosettes are now available and are very desirable plants.

*Plectranthus australis* — Swedish ivy or Irish ivy — This plant is a member of the mint family and has interesting square stems. The opposite leaves are bright green, glossy, with toothed edges. It will trail down over the sides of the pot as a many-branched vine. It will do best with some sun.

*Cissus rhombifolia*—grape ivy—This very durable vine has dark green, shiny leaves with three leaflets. It is very tolerant of hot, dry air and can be used where English ivy will fail. It likes to have the leaves sprayed occasionally. While some sun gives best results, grape ivy will tolerate indirect light. The kangaroo ivy, *Cissus antarctica*, is a

related vine which is also very desirable and very easy to grow.

*Begonia semperflorens* — wax begonia — The wax begonias are a good choice for flowering plants which are easy to grow. They must have some sun but should not be too near the glass. If the leaves begin to look pale or dry on the edges, move back from the window or put a sheer curtain between the plant and the window. Keep the plant moist but never soggy. Good drainage is a must. Pinch back to keep bushy.

#### MODERATELY-EASY-TO-GROW PLANTS

These plants are a little more exacting in their requirements than those mentioned in the foregoing list, but none of them is really difficult to work with.

*Hedera helix* — English ivy — This is a plant of the temperate regions rather than the tropics. To be successfully grown, it needs as cool a location as possible, with good light. Spray the



Coleus 'Red Rainbow'

leaves frequently and be on the watch for red spider. If the leaves on English ivy turn dark and wither it is usually because the air is too hot and too dry.

*Saintpaulia* — African violet — This very popular flowering plant is not difficult to grow with care. Do not over-water. An east window provides ideal light conditions.

*Codiaeum* — croton — This plant adds a brilliant splash of color to the indoor garden. It needs some sun to keep its color. Keep evenly moist but not constantly wet. Spray leaves often and, if possible, grow on a pebble tray to increase humidity.

*Begonia*—angel-wing, rex and other fancy-leaved varieties. Avoid drafts and abrupt temperature changes. If the angel-wing is kept too moist it will drop

its leaves. Water angel-wing when the soil has dried out. Rex prefers more moisture, but should never be water-logged.

*Pelargonium*—geranium—Needs sun in order to bloom but the pot should never become hot. Some successful growers use two pots, the outer one filled with peat. Keep on the dry side and do not over-fertilize.

*Dieffenbachia*—dumb cane—If your room is small, stay away from *Dieffenbachia* as it becomes quite large. It can be air-layered and kept to a reasonable height. Keep this plant on the dry side, soaking it thoroughly and then allowing it to dry out between waterings. Indirect light is best. The variety *Dieffenbachia amoena* is the easiest one to grow.

## New Plant Society

ON SEPTEMBER 8, 1965, the State of North Carolina granted a certificate of incorporation to the Indoor Light Gardening Society of America, Inc.

Organized to stimulate and promote interest and educational information on gardening with artificial light, this non-profit society wishes to encourage the development and introduction of new and improved equipment and methods of growing; to gather and publish information in regard to methods and results of sunless gardening; and to bring into friendly and educational contact all persons who grow plants of any kind under artificial light.

At present there are three "Round

Robins" for the exchange of information among the members, and publication of the first bulletin is planned for January 1966.

Payment of 1965 dues will entitle you to a charter membership, but bear in mind that renewal of your membership will be required as of January 1, 1966.

Classes of membership are: Regular or Annual, \$4.00; Contributing, \$6.00; Sustaining, \$12.00 per year, and Life, \$50.00. All carry the privileges of a regular membership. Make check payable to: Indoor Light Gardening Society of America, Inc., and send it to: Membership Chairman, Mrs. Robert G. Washburn, P.O. Box 39, Chipewala Lake, Ohio 44215.

# Bonsai

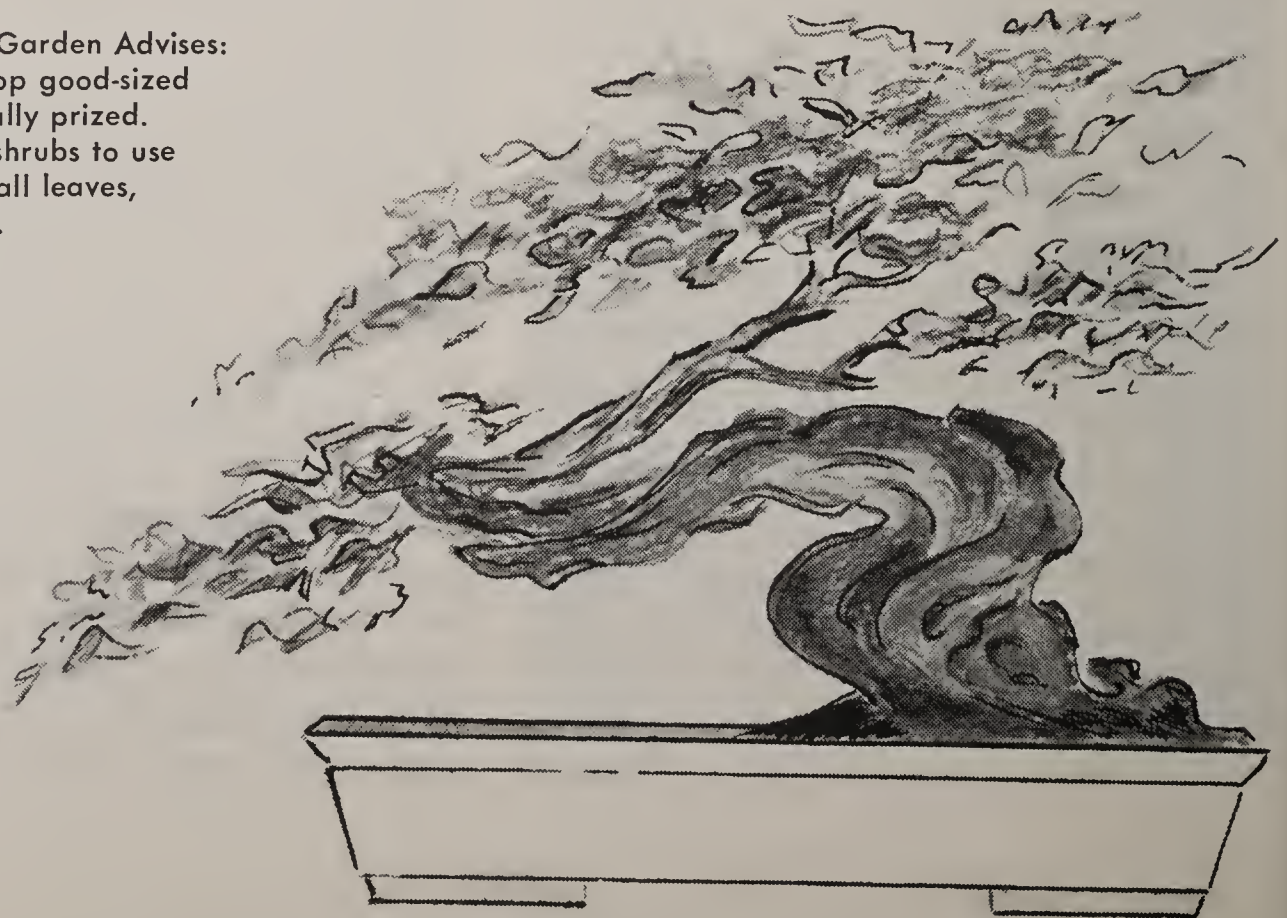
The word Bonsai, literally translated, means "tray tree." The word is pronounced "bone-sigh" and not "Bon-zi."



George Fukuma, a leading authority on Bonsai culture in this area, asks persons interested in formation of an English-speaking Bonsai organization to call him at 255-5277 or 355-0373.

The Denver Bonsai Club, with George Inai as president, annually displays its art at on October exhibit at Denver-U.S. National Bank. Although visitors are welcome at the club's regular meetings the language spoken is primarily Japanese.

Brooklyn Botanic Garden Advises: Bonsai that develop good-sized trunks are especially prized. The best trees or shrubs to use are those with small leaves, flowers and fruits.



# Discontinuance of Ads

The following letter is being printed in this issue of *The Green Thumb* in order to acquaint members of Denver Botanic Gardens and long-time readers of the magazine with the basic facts concerning the necessity for dropping advertising in its present form effective with the January-February 1966 edition.

The original of this letter was sent to all of the companies and individuals who so faithfully supported our advertising program throughout the years.

DENVER BOTANIC GARDENS  
909 YORK STREET  
DENVER, COLORADO 80206

Dear Mr. Advertiser:

Advertising in its present form will be discontinued in The Green Thumb magazine effective January 1, 1966. Because you are a staunch supporter of Denver Botanic Gardens and have consistently advertised in the magazine for many years, we feel you should know the principle reasons behind this decision.

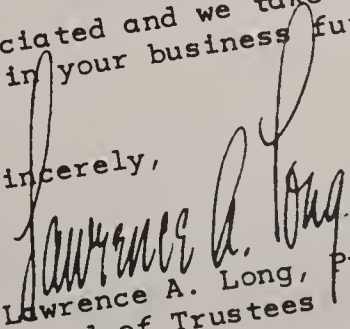
It simply doesn't pay off! It has been increasingly apparent to the members of the Editorial Committee during the past year that the amount of time and effort devoted to the advertising in each issue by the staff at Botanic Gardens was probably more valuable than the revenue accrued. The size of the magazine itself limits the amount of advertising and the circulation limits the amount that can be charged for space. Since The Green Thumb devotes itself to horticulture and botany in a restricted area of the country, there is little possibility that the circulation can be significantly increased.

We feel, in addition, that many of our loyal advertisers have continued to favor us with their advertising out of this very feeling of loyalty rather than because there was definite evidence of value received through increased sales.

It is our hope that you will continue to be affiliated with Denver Botanic Gardens in other ways; we need the help of all civic-minded persons, particularly businessmen. The Conservatory, which will be completed in the not-too-distant future, will be a great attraction for people from all parts of the state, the country and from foreign countries. It will put Denver botanically on the map. When Horticulture Hall has been built we will have another facility for providing better service to the public.

Your loyalty over the years is greatly appreciated and we take this opportunity to extend our best wishes for success in your business future, keeping pace with the growth of Denver.

Sincerely,

  
Lawrence A. Long, President  
Board of Trustees

LAL;lm

# Landscaping the Conservatory and The Home, Basically the Same

BY RICHARD MAYER

HOW CAN THE home we live in be basically the same as the new Denver Botanic Gardens conservatory with its huge plastic dome and many exterior light poles that resemble concrete trees? Basic ideas of exterior and interior landscape architecture are the same, whatever the locale, scale or type of area that needs landscaping.

In October and November of 1965, the Denver Botanic Gardens crews were busy preparing for the 1966 winter dedication of the conservatory. Minimum exterior plantings were needed to give a somewhat finished appearance around the main entrance as well as complete landscape treatment of the interior tropical area. These developments illustrate various principles of landscape design that are as applicable to home grounds as they are to the conservatory area.

The atmosphere which the designer hopes to create in landscaping should be apparent as soon as a person enters the site. Immediately inside the main York Street entrance gate are planted staghorn sumac shrubs, imitating the tropical leaves that are found inside the conservatory. Many kinds of broadleaf evergreens are placed at strategic points along the approach to the building offering leaves very similar to those of many tropical plants inside.

All landscape plantings should conform in scale, texture and form to the architectural style of the dominant

structure on the site. The lines of the conservatory are repeated with plant material. Looking west from York Street one sees that the horizontal deck line of the front elevation of the building is repeated on the ground with a row of low, spreading Weaver junipers. At the west entrance to the conservatory another attempt was made at fitting the planting to the architecture. Here are two passageways which are pyramidal in outline. A planter on each side contains an upright juniper for its pyramidal shape, thus making a continuous, matching pattern.

Pedestrian traffic can be guided into desired circulation patterns by plantings. Closely spaced Hetzi and Weaver junipers, on the east and south sides of the refreshment terrace, discourage traffic across the planting areas. When they reach mature size, the thorny *Pyracantha coccinea lalandi* shrubs bordering the junipers south of the terrace will more effectively keep the people on the concrete-surfaced areas.

The entire site should be tied together by repeating some basic theme. Inside the conservatory, the basic theme is the tropical setting. Rocks are used extensively and this use is repeated outside. A logical rock-outcropping location was selected and developed outside on the southeast side of the conservatory on the slope away from the building. Constructed rock-outcroppings should always look as though nature had casually left them there. Weathered rock surfaces should

Removing Tropical  
Plants from  
Semi-Trailer Truck



Looking East into  
the Unfinished  
Conservatory

Rock Outcropping Placement  
at Southeast Corner  
of Conservatory



always be left exposed, and the rocks should be arranged so as to resemble as nearly as possible a natural outcropping.

A key to good landscaping is the creation of some interesting feature. Water has always held man's interest; — the noise of a waterfall, the cooling influence, the refreshing effect on surrounding vegetation. Emphasis on water features in creating a tropical landscape inside the conservatory was therefore logical. A stream meanders from one end of the conservatory to the other, finally coming to rest in a pool at the lowest point. Waterfalls are located so as to take advantage of sudden grade changes and are so placed as to afford the visitor full views from various vantage points. A pump recirculates the water for economy.

Changes in topography give interest to the relatively flat plateau on which Denver is located. A grade change of 20 feet is developed within the tropical garden created inside the conservatory. Many of the tropical plants are native on rugged terrain, therefore, they fit well into the rough naturalistic settings.

Outside, along the south elevation of the conservatory the slopes create an ideal location for plants ranging in height from ground covers up to large shrubs. Such grade changes create interest by breaking the monotony of the flat area. Likewise, in many home landscape situations, similar interest can be achieved by elevating the general grade, by mounding or by raising planting beds.

Topography changes are made not only by grading the land but also by using plants of different heights. Low materials are used on the outer edges of planting areas. Gradually the height increases to the center of the bed or to accent plants. This interesting effect

is produced both inside and outside the conservatory. In the outdoor planting beds bordering the refreshment terrace, junipers are used for this aesthetic build up: From low Wilton junipers which make a good ground cover twelve inches high to tamarix junipers which eventually may reach a height of four feet, to Weaver junipers which will attain a height of four to five feet, to Hetzi which may grow six feet tall.

Interesting exotic plants are always eye-catchers. This principle is applied in the plantings made both inside and outside the conservatory. Inside, the various Hibiscus shrubs with multi-colored blooms, *Solanum rantonetti* with its blue flowers and Plumbago with red bloom, to name a few, are placed at strategic locations for interest. Outside, broadleaf evergreens such as Curl-Leaf mountain mahogany, Cliffrose, Euonymus and Pyracantha, with its fall orange-colored berry, are used for the interests of discovering these broadleaf shrubs that are green all year around. Curl-Leaf Mountain Mahogany and Cliffrose, both natives of Colorado, are few in Denver plantings and therefore should interest many who notice the unusual.

Broadleaf evergreen shrubs should always be used with caution in the Denver area. Points to consider are: 1. their hardiness to Denver climate, 2. planting in a somewhat sheltered location (some of the pyracanthas in the areas outside the conservatory have junipers planted next to them for protection from winter sun), 3. regular winter waterings.

Keep in mind that these are but a few basic landscape ideas and the use of these and many more can and sometimes should be applied by the home landscaper. They and many more were used at the conservatory.

"Jeeping" Tropical  
Trees into  
Conservatory



Placement of Palms  
Inside Conservatory

Placing Juniper  
Around Outside  
Rock Outcropping at  
SE Corner



# Exotics of Colorado

## The Chinese Elm

DR. HELEN MARSH ZEINER

IN BACK OF every exotic plant lies an interesting story about its discovery or about the person who made the discovery.

Chinese elm, *Ulmus pumila*, is no exception to this rule. This tree, commonly called Chinese elm in this area, is also known as Siberian elm, Asiatic elm, Pekin elm, dwarf elm and dwarf Asiatic elm.

In literature, *Ulmus pumila* is usually referred to as Siberian elm, while *Ulmus parviflora* is referred to as Chinese elm. However, since common usage to a large extent determines the common name, this tree will always be known in this area as the Chinese elm.

It is common knowledge that the Chinese elm is not a very desirable tree for street planting because it breaks easily and seeds to the point where young elms in the borders be-

come obnoxious weeds. However, Chinese elm does grow rapidly and thus provides quick shade. If used along with a slower-growing but more desirable tree, with the idea of removing the elm when the better tree has attained a suitable size, Chinese elm has some value.

To be fair to *Ulmus pumila* and to Frank Meyer, who introduced it to this country, it should be emphasized that the use to which we put this tree is not the use that Frank had in mind when he brought it to America.

We plant *Ulmus pumila* in our towns and cities and lavish irrigation water on it. Frank Meyer intended it for use in non-irrigated areas where other trees would not grow. Here it does have value, for it will grow in poor soil and will survive drought and general abuse. Frank Meyer must have been an interesting person and to know him should have been a rewarding experience.

While still a young man he came to the United States from Holland where he had been employed as head gardener under Hugo De Vries, a well-known Dutch botanist. This was just after the turn of the twentieth century.

The United States Department of Agriculture was in need of a plant explorer to go to China in search of new plants suitable for use in the United States. It heard of Frank Meyer, who seemed made-to-order for

the job. He had an almost passionate love for plants, which he thoroughly understood; he also loved to walk. This love of walking was a strong point in his favor for the job since transportation in China at this time was practically nil. Walking was almost always a necessity.

Tales about Mr. Meyer reveal that he had not the slightest interest in clothes and that at times his personal appearance left much to be desired. History records, however, that he had excellent taste in such matters as the selection of beautiful vases and flower pots and their proper display. Once, we are told, he rearranged the living-room of a hostess who used too much bric-a-brac, putting out of sight all but a few choice pieces. We are also told that she liked the effect and was not offended.

While Frank Meyer may have been lacking in social graces, his wit and his obvious intelligence and enthusiasm made up for his shortcomings. As soon as he became an employee of the United States Department of Agriculture, he was sent to China for a period of three years. When he returned, he brought with him about 75 new species and varieties of plants, including several varieties of soy beans. He felt that soy beans could become a useful crop in America. In his travels, he was never guilty of padding an expense account. He walked, lived in Chinese inns and ate Chinese food. He became well acquainted with the poor farmers of China and was able to tell many interesting stories about these people, their way of life, their foods and their humble homes. He endured many hardships while traveling afoot and is known to have survived some dangerous experiences. David Fairchild, a well-known plant explorer and friend of Frank Meyer, related how

Meyer would come to his laboratory and lie on the floor to talk, while Fairchild jotted down notes about his travels.

Later, Meyer was sent, at his own request, to the Caucasus, Russian and Chinese Turkestan and Siberia. From these regions, he sent back many plants, including a number of wild roses, apricots and almonds. He was very interested in fruits which would thrive in alkaline soils.

His third trip was again to China. At the time of this trip there was some concern about the chestnut blight, and Meyer reported the same fungus from eastern China.

On his fourth trip to China, in 1918, Frank Meyer met his death under mysterious circumstances. He disappeared from a steamer enroute from Hankow to Shanghai. His body was recovered from the river and buried in Shanghai, but the mystery of his death was never solved to the satisfaction of his friends. There was no evidence of foul play, and his friends doubted that he would have committed suicide. If his death was accidental, no one will ever know.

After the death of Frank Meyer, the United States Department of Agriculture struck a Meyer Medal for meritorious work in the field of plant introductions, and a number of scientists have been awarded this honor for their work in this field.

*Ulmus pumila* was introduced by Meyer as a dryland elm from north China. Seedlings were grown in experimental gardens at Mandan, North Dakota, and Reno, Nevada. For people in these arid treeless areas in the early 1900's, *Ulmus pumila* must have been a godsend. While we regard it as a weed tree, we should remember that it is a valuable dryland tree, has other uses — and an interesting history.

# BROMELIADS, The Colorful House Plants

By MR. JACK KRAMER

A Book Review

THE BROMELIADS comprise a group of plants which deserve to be better known for many of them are well-suited to be used as house plants.

The Helen K. Fowler Library at Botanic Gardens House has just acquired a book which deals entirely with these interesting plants. Its title is: *Bromeliads, the Colorful House Plants*, by Jack Kramer.

Mr. Kramer has grown a variety of Bromeliads successfully in his Chicago home, and his book describes his cultural practices. This book is a small volume of 113 pages, divided into five chapters, with an appendix, and has a practical approach which should appeal to the average indoor gardener.

Chapter One furnishes an excellent general introduction to the Bromeliad group, describing many characteristics of the plants.

Chapter Two contains concise and helpful information about selecting and buying your first Bromeliads.

Chapter Three, "Growing Bromeliads in Your Home," gives good cultural instructions for the group as

a whole and should be very useful to anyone interested in experimenting with these plants.

Chapter Four, "Enjoying Bromeliads Indoors and Out," suggests various ways to make use of Bromeliads as part of the landscaping plan and for indoor beautification.

Chapter Five, "150 Colorful Bromeliads," describes the better-known varieties. This chapter is illustrated with black and white drawings which give a good idea of the habit of growth and type of flower. Some specific cultural directions are included.

The appendix includes a table of Bromeliads with their characteristics and the exposure needed, a list of easy-to-grow Bromeliads, a list of Bromeliads for specific locations, such as sun or shade, a classification by types of inflorescence, and a list of sources for Bromeliads and supplies.

The book contains a few colored pictures which give a good idea of what Bromeliads are like, although the colors are not perfect.

H.M.Z.

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Friday, February 25, March 25 and April 29, 1966

*as follows:*

- February 25 — Treat Hall, Colorado Woman's College  
Dr. Ralph Baker, Colorado State University, Plant Pathology.  
Exploring extraterrestrial plant pathology and some projected biosatellite explorations.
- March 25 — Treat Hall, Colorado Woman's College  
Mr. Ernest Bibee, Superintendent, Boettcher Conservatory.  
Review of the conservatory and some of its features and possibilities as an educational facility.
- April 29 — Treat Hall, Colorado Woman's College  
Mrs. Raymond Watts, Naturalist Emeritus, the Morton Arboretum. Subject to be announced later.



Tickets for each lecture are \$1.00 each. Students, 50¢.  
They may be obtained in advance at Botanic Gardens House, 909 York Street and at the door on the night of the lecture. Season tickets already purchased are good for all three lectures.

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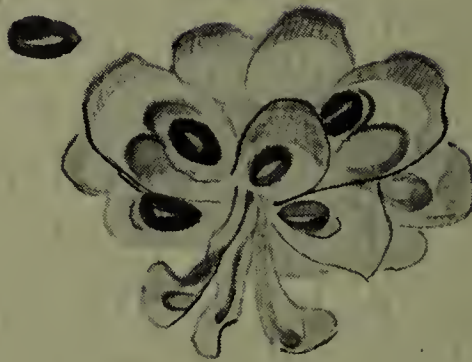
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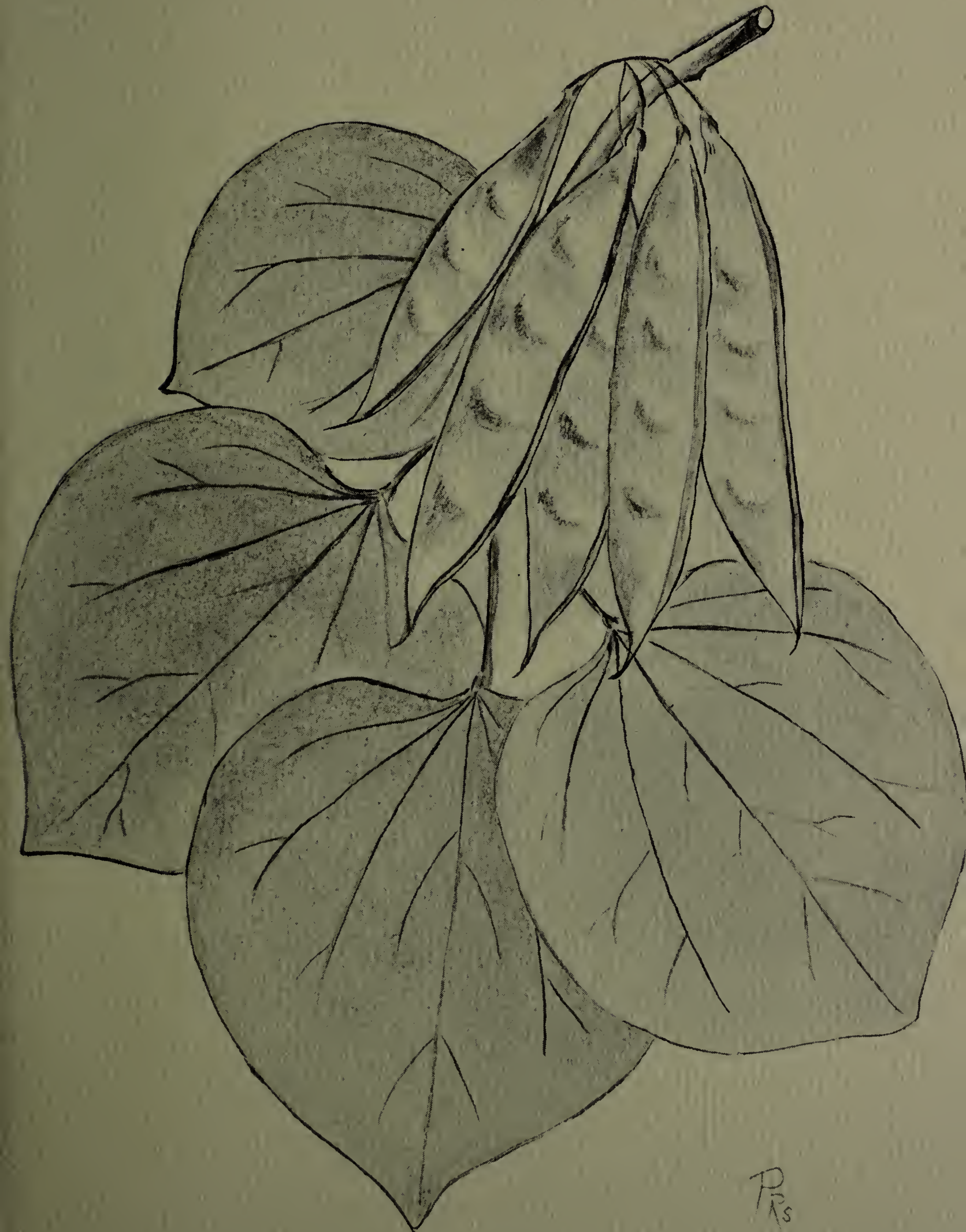
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A botanic garden is a collection of growing plants, the primary purpose of which is the advancement and diffusion of botanical knowledge. This purpose may be accomplished in a number of different ways with the particular placing of emphasis on different departments of biological science.

All of the scientific and educational work of a botanical garden center around the one important and essential problem of maintaining a collection of living plants, both native and exotic, with the end purpose of acquisition and dissemination of botanical knowledge.

# The Green Thumb

MARCH-APRIL 1966



THE COVER

*Cercis canadensis L.*  
Redbud Leaves and Pods

*THE GREEN THUMB*

VOLUME TWENTY-THREE, NUMBER TWO

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# The Green Thumb

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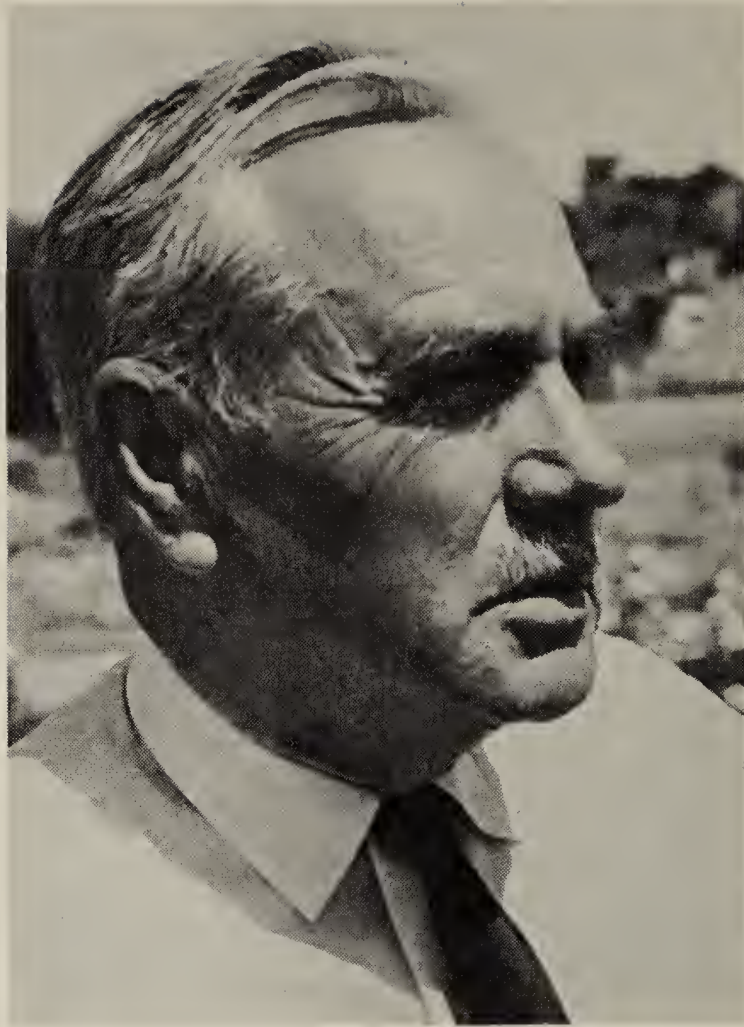
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By becoming a member of Denver Botanic Gardens, you will receive *THE GREEN THUMB* and the monthly *NEWSLETTER*. You will also have unlimited access to the use of the books in the Helen K. Fowler Library at Botanic Gardens House.

For further information write to the Membership Chairman, Mrs. William Stanley, 3800 East Long Road, Littleton, Colorado 80120 or call 771-3617.



## Report on *Denver Botanic Gardens* for 1965

A. C. HILDRETH, *Director*

**D**ENVER BOTANIC GARDENS officially came into existence on February 3, 1951, when the Secretary of State of Colorado signed the certificate of incorporation. The organization, therefore, is only fifteen years old. Consequently, our botanic gardens must still be listed among the very young of such institutions.

**Construction:** The year 1965 was the most important one to date in the development of the gardens. It marked

the completion of two major construction projects, the conservatory and its auxiliary greenhouses. In addition, substantial progress was made toward raising funds for the erection of another important structure, Horticulture Hall. More than a third of the money required for its construction is already on hand or pledged. Horticulture Hall will be the last unit of the one-and-a-half-million-dollar building complex thus far planned for the gardens.

## The Conservatory

The recently dedicated conservatory won international recognition from architects and engineers even before it was completed. It is a beautiful and unique structure. As an architectural feature alone, it is a great asset to Denver Botanic Gardens and to the City and County of Denver. This is the only conservatory in America made entirely of concrete and plexiglass, with the concrete poured in place.

The interior departs from the classical arrangement of plantings, walks and ornamental structural features typical of older conservatories. Ours is essentially an enclosed bit of rugged tropical terrain, with naturalistic pools, waterfalls and jungle plantings, among which wind irregular trails.

The climate inside the conservatory is warm and humid, simulating the conditions of lush equatorial areas where so many interesting and important plants are found.

For the conservatory plantings, two large transport loads of tropical trees, shrubs and vines were brought from southern Florida, and one from south Texas. Four smaller loads were brought from St. Louis, Missouri — gifts of the Missouri Botanical Garden. In addition, many fine tropical plant specimens have been donated by commercial greenhouses of this region and by people who practice indoor gardening in their homes or in hobby greenhouses. At present, approximately 600 species and varieties of tropical plants





have been acquired for growing in the conservatory.

In late fall, a beginning was made toward landscape development of the area immediately outside the conservatory. Plantings of trees, shrubs, vines and strips of lawn were made around the entrances and along the east approach to the building. Design and supervision of the landscaping both inside and outside the conservatory were under the general direction of Mr. Ed Wallace in charge of the Parks Planning and Engineering Division of the Parks and Recreation Department. He was ably assisted by two landscape architects of his staff, Mr. Richard Mayer and Mr. Roger Buck.

The first of February, 1965, Mr. Ernest Bibee joined our staff as Conservatory Superintendent. Previous to his coming to Denver he was Horticulturist at the Climatron in the Missouri Botanical Garden. Before that he worked several years at a tropical plant nursery in southern Florida. With consummate skill and almost superhuman effort, Mr. Bibee succeeded in keeping the great number of assembled plants alive during many months of delay in completing the conservatory. We are most fortunate in having a man of Mr. Bibee's training and experience in charge of our conservatory development.



## General Garden Developments

Although completion of the conservatory and its auxiliary greenhouses was the outstanding development of the year, there were other noteworthy achievements. Most important of these was the completion of the herb garden.

**Herb Garden:** The herb garden is a gift of the Denver Botanic Gardens Guild, a volunteer organization operating for the benefit of Denver Botanic Gardens. This group raised funds for the herb garden by selling garden calendars, designed and published by Guild members and also by selling herb plants and herb products.

The garden was designed by Mrs. Persis M. Owen. The construction contractor was Mr. Sigurd Stein. The walks are of red brick, laid out in the intricate pattern of a "knot garden" of past generations. The beds are planted with both rare and familiar garden herbs. In an adjacent area is a small nursery where herb plants are grown for the formal part of the garden and also for the annual plant sale.

**Guest Iris:** The American Iris Society has decided to hold its 1967 conven-

tion in Denver. It was in 1963 that our city was last host to this Society. Two or three years before a meeting, members of the Society start sending stock of their new iris creations for planting in the host city, so that the plants will be at the proper stage for blooming the year of the convention. Such plants are known as "guest iris."

Denver Botanic Gardens grew the guest iris for the 1963 convention and will also grow them for the 1967 convention. During the past summer and fall, 141 members of the American Iris Society, representing 27 states, sent rhizomes of 920 different iris selections for the planting. It is anticipated that a few more selections will be received in 1966. The guest iris garden for the 1967 meeting is located in the northwestern part of our York Street Unit.

**Tulip Trials:** Another test planting of old and new tulip varieties was made last fall. This is our third such test undertaken in cooperation with the Netherlands Flower-Bulb Institute, Inc. The 1965 planting brings to 23,050 the total number of bulbs included in our test. Our plantings, of course, are only a small part of the world-wide tulip trials being conducted by the Institute.

**Gladiolus Trials:** The Colorado Gladiolus Society again grew a fine gladiolus garden at our York Street Unit. Both standard varieties and breeders' numbered progenies were included. Two prominent gladiolus breeders of Denver, Mrs. Alice Wood and Mr. Lee Ashley, supplied the planting stock and made the plantings. Approximately 8,000 plants flowered, about 5,000 of which were seedlings. A few

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The Denver Botanic Gardens Conservatory is open to the public, free of charge, every day Saturday through Thursday from 9:00 a.m. to 5:00 p.m. and on Friday from 9:00 a.m. to 9:00 p.m. The Conservatory telephone number is 297-2348. Please call there for any information about the new building.

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1965 Children's Garden Award Winners: Debbie Yeager, Tia Kawakami, Mike Edwards and Donna Stanley

of the seedlings may be worthy of introduction.

**Dahlia Tests:** The Denver Dahlia Society enlarged its 1965 planting, under the guidance of President Pat Deffner. The display of bloom and the yield of tuberous roots were both somewhat disappointing. This was probably due to unfavorable weather,

including a hailstorm which did considerable damage to the plants and flowers.

Twenty-four dahlia varieties were included in the 1965 test for the American Dahlia Society. There were also 150 named varieties in the display planting. In addition, about 100 seedling plants were grown for selection.

## Programs and Activities

**Children's Gardens:** The Children's Garden Program for 1965 was considerably larger than in previous years. A total of 309 children participated at four different locations.

In the Children's Garden at our York Street Unit, 111 youngsters grew gardens and received certificates for their successful completion. These gardens, as well as the exhibits at the Fair on graduation day, were rated by a committee of Accredited Amateur Judges of the Colorado Federation of Garden Clubs. Serving on this panel were Mrs. Russell Qualls, Mrs. Claude Burt and Mrs. W. G. Gressett. Prizes were awarded for superior gardens, and ribbons were given for outstanding exhibits. The Kiwanis Club of Denver

again entertained the prize-winning gardeners at luncheon and gave each a five-dollar check.

Chairman of the Committee of Supervisors for the Children's Garden was Mrs. Anita McDonald. Other members of the committee were Barbara Brin, Doris Danahey, Tess Donahue, Marion Edwards, Virginia Faxon, Yolande Fillis, Mary Frawley, Bill and Millie Grant, Eleanor Green, Richard Holcomb, Dr. Joseph Hovorka, Frank Jaramillo, Mary Jepson, Emily Joy, Mary Kauffmann, Eddie Kawakami, Valora Kenney, Sheila Kirchhof, Rose Lips, Mrs. T. J. Longley, John Maloney, Stella Martin, Martha Metzger, Louise Mosley, Nancy Murray, Rosemarie Pretz, George and Ann Pugh,



Girl Scouts Debbie Turner and Robin Fortner

Gen Turner, Robert and Edna Vessa, John and Irene Vittetoe and Olga Wolf.

“Off campus” children’s garden programs were conducted in cooperation with three different organizations. Participation of the Denver Botanic Gardens consisted in furnishing the tools, seeds and technical instruction and doing the necessary machine work in preparing the land.

At the Denver Christian Center 83 children of various ages participated. At the Retarded Children’s Center, 8000 Montview Boulevard, we cooperated with the Director, Mrs. William Bell, and her enthusiastic staff, in operating a garden program for 100 retarded children. A similar program was conducted at Auraria Community Center where 15 retarded children participated.

**Lecture Series:** The past year the Education Committee, under the leadership of its chairman, Dr. Wayne Christian, arranged a series of six public lectures on botanical subjects. The series began in the fall of 1965 and will continue into 1966, ending the 29th of April. Previously, a few individual lectures had been sponsored by Denver Botanic Gardens but this is the first time that they have offered to the public a whole lecture series.

**Publication:** During the past summer the valuable little booklet called “What Tree Is This?” was reprinted by Denver Botanic Gardens. This booklet, written by Mrs. Charlotte Barbour and Mr. Earl Sinnamon and illustrated by the late M. Walter Pesman, was first published in 1950 by the City Forester’s Office of the City and County of Denver. Funds for the second print-

ing were donated by Mrs. Barbour and proceeds from the sale of the 5,000 copies will be used for the further development of the Helen Fowler Library.

### Acknowledgements

No botanic garden with a skeleton staff and a meager budget such as we have, could possibly develop and carry on its normal functions without volunteer assistants. We are fortunate in having three very active volunteer organizations: Around the Seasons Club, Denver Botanic Gardens Guild, and Associates of Denver Botanic Gardens. Members of these groups have participated in practically every phase of our botanic garden work, including such varied activities as pulling weeds, editing, managing garden tours and plant sales, maintaining the herbarium, operating the gift shop and the library and developing the herb garden.

Also important to us have been the generous business establishments which have donated services and materials. Particularly noteworthy have been the spraying services donated by Swingle Tree Surgeons, Inc., and by T. R. Collier; the garden tools donated by the Rocky Mountain Seed Company as prizes for the winning children’s gardens; the soft drinks donated by the Seven-Up Bottling Company for festive occasions in the Children’s Garden, and the bedding plants donated by Hannigan Floral Company.

Special acknowledgements are due Park Floral Company of Englewood, Richard’s Flowers of Fort Collins and Lakewood Floral Company of Lakewood, and numerous private indoor gardeners who gave so many fine plant specimens for the new conservatory.



Volunteer Worker Planting in Conservatory



Jane Weston (left) and Cathy Petersen serve as sales clerks in gift shop



Redbud Tree — *Cercis canadensis*

# Redbud Tree

DR. HELEN MARSH ZEINER

A FEW YEARS AGO, the redbud, (illustrated on page 40) was seldom seen in Denver. Today a number of redbuds are being grown successfully in this area.

Redbud is a member of *Leguminosae*, the pea family. Its botanical name is *Cercis canadensis*.

It is a small tree, with dark red-brown bark. The leaves are large, dark green, and heart-shaped. The rosy-lavender flowers occur in small clusters of 4 to 8, usually before the leaves appear. Each individual flower is a pea-like blossom about one-half inch long. Since the flowers appear before the leaves, a redbud tree in bloom is very striking. In Denver, the blooms are usually seen in May.

The fruit is a typical legume pod, small and flattened, and purplish-brown at maturity.

Redbud is also known as the Judas Tree. It is said that Judas hanged himself on a redbud tree.

In one local area in Indiana, where redbud is very common, it is called "fish blossom" because the larger fish spawn when the redbud is in bloom.

However, redbud is the most widely used common name. It is a very appropriate name, since the buds are quite red before they open.

In its native habitats, redbud often makes great masses, and is often as-

sociated with flowering dogwood which blooms at the same time. The combination is an unforgettable sight.

The natural range of *Cercis canadensis* is from New York and New Jersey west to southern Ontario, through Michigan and Iowa, south to the Gulf states, and westward to Texas. It reaches its peak of abundance and perfection in the southern half of its range, and perhaps is no more beautiful anywhere than in the hills of southern Indiana, where it is frequent in wooded ravines or on slopes, often covering large areas.

Beautiful as the redbud is when in bloom, it is classed as a weed tree and is grubbed out to make way for more useful species. The wood is hard, but the tree is too small to be of commercial value. Its only economic importance is as an ornamental.

If you wish to plant a redbud in this area, pick a protected site. The east side of a building or between buildings seem to be suitable locations. Some redbuds are being used as accent trees in front of clumps of evergreens which provide shelter. They endure shade in nature, but grow best in partial shade or in the open.

Redbuds are best transplanted when very young. Even in their natural range, older trees are difficult to transplant successfully. They prefer a rich

moist soil, with good drainage. However, winterkill rather than soil appears to be the greatest difficulty in this region. Greater care in the choice of a location should overcome some of this difficulty and permit the use of more redbud trees.

For those who do not know the redbud, there is a large and well-established

redbud on the South High grounds, in the shelter of the building. There is also a small redbud on the Denver Botanic Gardens grounds, back of the house and near the garage. These trees should be blooming in May, probably early in the month, and can be recognized by the rose-lavender, pea-like flowers.

## DENVER BOTANIC GARDENS ANNUAL PLANT SALE

May 6 and 7

9:30 a.m. to 5:30 p.m.

Annuals

Perennials

Rock Plants and Ground Covers

Selected Trees and Shrubs

Geraniums and Hanging Basket  
Plant Materials

Herbs, Vegetables and Fruits  
Herb Vinegar

Donated Garden Plants at the  
Bargain Corner

House Plants

Children's Corner

*Mother's Day Gifts — Information — Visit Tulip Display*

## "Dry Land" Landscaping in the State of Colorado

A TOTAL of 41,000 trees and shrubs were planted along Interstate 70, east of Denver, in so-called "dry land" landscaping since there is no sprinkler system and vegetation is expected to take care of itself.

Hardy type trees, such as Russian Olive, Western Catalpa, Ponderosa Pine, seedless Cottonwoods, Siberian Elm, New Mexico Privet, Chokecherry and Rocky Mountain Sumac were planted.

Colorado is especially interested in overlook areas where people may park off the highway and take photos of the mountains. Planting is continuing along Interstate 25 from Wyoming to New Mexico and along Interstate 80-S. Snow fencing of conifers also is being planted in order to minimize winter maintenance.

*Editor's Note:* The foregoing is reprinted from the *Highway Landscaping News*, a publication of the American Association of Nurserymen, Public Information Service, 10 E. 43rd St., New York, N.Y., Dec., 1965.

# All-America Winners Among Flowers - Vegetables

SIX FLOWERS and two vegetables were named the best of their kind for 1966 by the All-Americas Selec-



Cosmos Sunset

tions. The new flower types and colors are as follows: a giant white pansy, the first red Klondyke cosmos and red annual sweet William, a garden type of open-faced snapdragon, a blue cushion-type verbena and a large yellow chrysanthemum-flowered marigold on foot high plants. A winter squash and a larger, longer lasting butterhead lettuce are award winners in the vegetable line.

Contact your seed or plant supplier for these varieties.

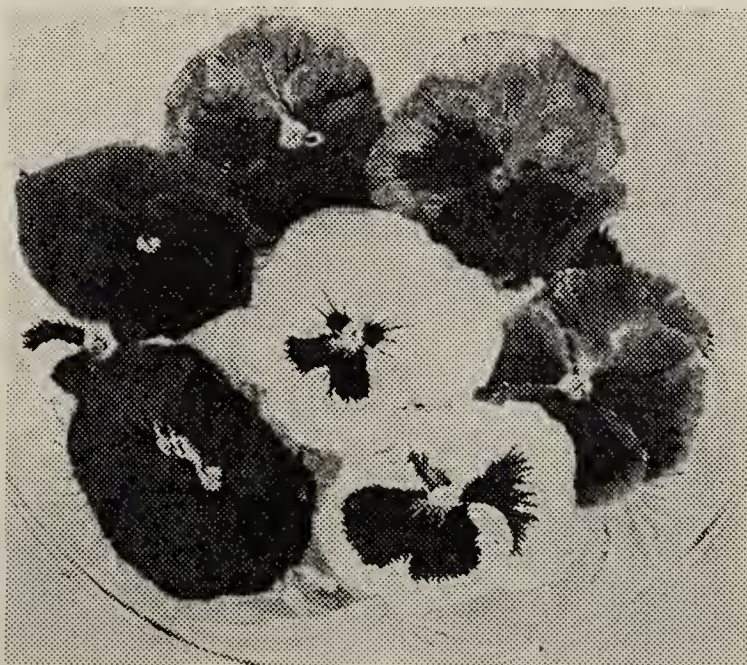
THE 'SUNSET' COSMOS, third gold medal award winner in the past 27 years, is a full blooming season annual sulphureus or Klondyke cosmos, formerly of gold or yellow, now

in scarlet red. Semi-double 2" blooms on 12 to 15" wiry stems are said to be borne freely over a longer blooming season. Bushy plant reaches 3' with 18 to 24" spread. A Japanese innovation which has performed well from the lower South to Canadian stations.

PANSY 'MAJESTIC WHITE WITH BLOTCH' is the first hybrid pansy winner. A giant in size, individual flowers have measured as wide as 4". White with large contrasting dark blotch in the center. Said to have remarkable hybrid vigor, standing up and continuing with large flowers in hot weather.

PANSY 'GIANT MAJESTIC MIXED' is a blended formula mixture of many separate F1 hybrid colors or varieties, including the White with Blotch, which are usually hardy through more southern winters.

SWEET WILLIAM 'RED MONARCH' blooms as an annual, and is



Pansy Majestic White  
with Blotch

the first and only solid red sweet William. Sown in early spring for summer blooming or in the fall for early spring blooming. Flowers of scarlet red with white stamens are borne in rounded clusters surmounting erect green plants. Reaches about 10" in height from spring sowing and about 16" from autumn sowing.

**SNAPDRAGON 'BRIGHT BUTTERFLIES'** is a formula mixture of separate F1 hybrid colors or varieties in a new class of garden snaps. Instead of tubular throated snapdragons, these are open faced, the dwarf Peloric or Juliwa type as shown in Europe. But they are vigorous hybrids of 3' height, midsummer blooming, with long spikes of open-faced flowers. Stocky, base branching plants produce to a dozen floral spires; if cut back after blooming or cutting they produce a second or third crop during the season.

**VERBENA 'AMETHYST'** is the only sky-blue dwarf compact verbena. Flattish flower clusters of 2¾" diameter are said to blanket the cushion-like 10" to 15" spread of 6" plants. Especially low and compactly growing for edging walks, patios, borders and for low beds.



Lettuce Butter King



Squash Gold Nugget

**MARIGOLD 'SPUN YELLOW'** is the yellow counterpart to the awarded 'Spun Gold' of 1960. Noted for early and long flowering. Said to have 12" height, rich green foliage and large chrysanthemum-flowered blooms.

**SQUASH 'GOLD NUGGET'** is a late or winter squash of small, softball size weighing 1½ to 2 lbs. Each compact plant said to produce five to eight fruits. All may be gathered when fully mature or after killing frost. Plants grow 2½' tall. Fruit has orange skin and sweet flesh high in dry matter.

**LETTUCE 'BUTTER KING'** is a larger headed 'White Boston' type. Height is about 7" with average head 5½" in diameter and weighing 12.8 oz. Said to be disease resistant, larger and later than the White Boston, slower to bolt and more sun or tip-burn resistant. Most highly regarded from eastern Canada to California and Mexico.

*The foregoing material is a reprint from **LAWN/GARDEN/OUTDOOR LIVING**, 1014 Wyandotte Street, Kansas City, Missouri, Vol. 4, No. 12, December, 1965.*

# Colorado Garden and Home Show

THE SEVENTH ANNUAL Colorado Garden and Home Show, the state's largest exposition devoted to modern indoor-outdoor living, will be held from Tuesday, March 29, through Sunday, April 3, at the Denver Coliseum and National Western Buildings. The 1966 version of this finest and largest annual display of garden and home merchandise and services in the region will be planned around a "Fiesta" theme, saluting our spirited and colorful neighbor, Mexico.

Hundreds of elaborate and exciting exhibits will offer a preview of the newest products and services for outdoor living, home planning and conveniences, garden and yard items, home improvement, maintenance and decorating suggestions.

The show will give expanded emphasis to appliance lines, with exhibitors spotlighting dramatic technological advances to make work and play more pleasant.

Again a "Vacation Home Valley" will be an impressive part of the show, with full sized cabins on display in a mountain setting. This display has been one of the most enthusiastically received of all during previous Garden and Home Shows.

Actual gardens, from informal to elegantly formal, will again be shown,

a competitive flower show will be held, and a cartoon theatre and aquarium show will be part of the lavish entertainment planned for guests.

Attendance at the six-day show is expected to exceed 70,000 in a projection of attendance ratios of previous years, by Garden Show Manager, Dick Haughton.

The much-needed expansion of the exposition in 1964 into the huge Coliseum as well as the National Western Buildings has been a highly important factor in the mushrooming growth and success of the show, according to show officials. The Garden and Home Show is produced by Colorado Garden Show, Inc., a non-profit organization, and is sponsored by the Denver Botanic Gardens, Inc.

Exhibitors and regional dealers who wish to have displays at the 1966 show are urged to reserve space now to make sure of advantageous locations.

Board of Directors for the Colorado Garden & Home Show:

Mrs. Ed. Honnen  
Mrs. Vivian Christensen  
Russell Myer  
Pat Gallavan  
Fred Vetting  
Charles Watenpaugh  
Earl Sinnamon

Reservations for guided tours of the Conservatory at Denver Botanic Gardens may be made by calling the Conservatory number, 297-2348, between 9:00 a.m. and 4:00 p.m. daily.

# Dedication of the Edna C. and Claude K. Boettcher Conservatory

The opening of the Edna C. and Claude K. Boettcher Conservatory became a reality with its formal dedication on Saturday, January 16, 1966. Prior to this dedication, on January 15, a preview reception was held for members of Denver Botanic Gardens in the Conservatory.

Lawrence A. Long, President of the Board of Trustees of Denver Botanic Gardens, presided at the dedication. Amongst others present at this notable event, in addition to a fine turnout by the public in general, were: Cris Dobbins, Chairman of the Boettcher Foundation; John A. Love, Governor of Colorado; Thomas G. Currigan, Mayor of Denver; Joe Ciancio, Manager of

Parks and Recreation; the Board of Trustees of the Boettcher Foundation; the Board of Trustees of Denver Botanic Gardens and the members of the City Council.

Following the dedication, the building was opened to the public, without charge. Denver area residents have shown their avid interest in this structure for more than a year as is evidenced by the many requests received at the Gardens for information regarding its purpose and date of completion, possibility of guided tours and entrance fee. Many of these requests have come from school teachers and children's group leaders. Since the formal opening, thousands of people



Ribbon Cutting Ceremony at Boettcher Conservatory, January 16, 1966

Left to Right: Mr. Joe Ciancio, Manager Parks and Recreation  
John A. Love, Governor of Colorado  
Mrs. Charles Boettcher II  
Thomas G. Currigan, Mayor of Denver



Mr. Lawrence A. Long, *President of the Denver Botanic Gardens Board of Trustees*  
Mr. Cris Dobbins, *Chairman of the Board of Trustees of The Boettcher Foundation*

have gone through the Conservatory and admired the very fine collection of tropical and sub-tropical plants which

has been established in a contoured area landscaped with rock outcroppings, streams, pools and a waterfall.

H.M.V.

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## Plant Sale

**Herbs** — Whether it's a pre-started window planter of mixed culinary herbs, a collection of scented geraniums, or seasonings and vegetables to delight the gourmet, the herb booth will offer a wide selection of annual and perennial herbs. Popular herb vinegars, a choice of fruit and vegetable plants as well as information on growing herbs and their uses will be available at the Annual Plant Sale, May 6 and 7.

**Donated Garden Plants** — A fun booth with many bargains for the novice gardener or seasoned hobbyist is the special corner selling donated garden plants. With the help of generous gardeners a wide selection of plants is offered at this bargain center, another feature of the Annual Plant Sale May 6 and 7 at Botanic Gardens House.

**Trees and Shrubs** — A select assortment of unusual trees and shrubs,

generally known, but semi-hardy and only occasionally grown in this area and hardy trees and shrubs, little known but readily grown in this area, are for sale at this booth. Special information concerning plant hardiness and growth requirements will be given the gardener seeking distinctive plants, such as redbud, European black alder or perhaps a horsechestnut. These will be available in limited supply May 6 and 7 at the Annual Plant Sale.

**Geraniums, Planter Material** — Geraniums — ivy-leaved, 'Martha Washington' or the hardy 'Irene' strain in many colors, are offered for borders, hanging baskets, planters or Mother's Day gifts at this special booth. Here, too, are thunbergia, dracaena and other hanging basket material popular at the Annual Plant Sale, May 6 and 7.

# Chinese Elm - Still More

S. R. DEBOER

THE MOST interesting article on Chinese elm, (*Ulmus pumila*), by Dr. Helen Zeiner (January - February, 1966 *Green Thumb*) intrigues me and I am prompted to add a few planting notes, beginning with some early work done at Buckley Field, on Sixth Avenue, east of Denver. America had just entered World War II and Buckley was one of the new Army Posts which were being built all over the country. Buildings had been erected there but money was lacking for landscaping the area.

Therefore, some of us in the landscaping field donated our services in order that the Post might become a little more livable. Trees could not be purchased except for a few small items which were paid for out of a petty cash fund. Captain Milam was in charge of the work and there was no lack of manpower for the physical labor required. In those days there was a great demand for the Chinese elm, although it was considered a second-rate tree and we planted but very few of them.

The Denver nurseries, however, anticipated a great demand for this tree and had planted thousands of them. With the advent of World War II, there was no market for them and the nurserymen realized that after the war they would be overrun with Chinese elm. Captain Milam learned that, while there were plenty of them available at a low price, there was no money available to purchase them for Buckley Field.

So it came about that the Denver nurserymen, out of pure patriotism,

contributed thousands of them (I believe 11,000) for the purpose of landscaping the Field. I often wonder if these generous people were ever thanked by the officials in Washington who were so immersed in war preparations at that time.

Dr. Zeiner's article made me wonder what had happened to these trees during the 25 years since they were planted so I went out to Buckley Field to look for them. The Post has been torn down and all buildings removed with the exception of one service building. But the trees are still there and, in spite of the fact that they have not been irrigated, they have grown to considerable size. They are standing along the abandoned roadways in knee-high weeds but they did survive. In the annals of Colorado tree culture I would say that this is a remarkable thing. Strangely enough to some of us, there are also some mature Bolleana poplars and several yellow pines.

The lovely Chinese elms were a god-send to the small cities on the plains of Colorado, Nebraska, Kansas — in fact, to the whole high plain plateau area from Canada to the middle of Texas. Hundreds of small towns were landscaped with them and these towns owe their livability to these small trees.

I remember Frank Meyer and his exploits and I have in my own yard several trees which he brought to America. So, Dr. Ziener's article prompted this personal reminiscence into the history of the Chinese elm in this area which I hope will be of interest to *THE GREEN THUMB* readers.

# HOMEOWNER!

## SPARE THAT TREE!

EDGAR A. JOHNSON,

*Landscape Architect, Denver Parks  
and Recreation Department*

**S**TOP! YOU'RE KILLING those beautiful trees! Think how nice their cooling shade will be next summer. Can't you see yourself stretched out in a lounge chair with a cold drink under that big spreading tree? See how this tree "frames" your house and makes it look so inviting. You could be known as the fellow who lives in that nice house with the beautiful trees. Notice the group of bushy trees over there — how nicely they will screen off the telephone pole and the back door of that other house. Every one of those trees is priceless! Why are you killing them?

Don't look so puzzled! Don't you know what you're doing? You say you are not killing the trees, but saving them. No, you're killing them — the chances of those trees surviving your new house construction are very slim. Let me show you what is happening to them.

Before this area was subdivided, these trees were not far from an irrigated field. As the field was irrigated or as rain occurred, the water soaked into the ground and probably ran underground to water the trees. How-

ever, let us see what is happening: All of those new basements may be interrupting the underground flow of the rainwater and the field is no longer irrigated—right now it is full of houses under construction. The new streets and storm sewers are draining away part of the rainwater; until the new homes are completed and the new lawns are being watered, your trees are apt to become very dry.

Look over here — see this new sanitary sewer? The trench has been dug down into the shale and will act just like an underground drainage ditch, draining away water that your trees need and carrying it to that group of lots over there. Those new homeowners over there may have just the opposite trouble from yours — their trees may be getting too much water. If you want to save your trees, you had better get some water to them. The water mains aren't in yet? Then haul in some water — lots of water — and pour it into shallow trenches dug around the trees in the area of their feeder roots which is about the outer perimeter of the branch spread. Too much bother? Then forget the trees or

import some Indians to dance for rain!

This isn't all you are doing that's wrong. You had better put a fence around *that* tree. Construction trucks and tractors are approaching too closely and are compacting the soil tremendously over the roots. The equipment is also breaking the lower limbs and scratching the bark of the trunk. By the time your house is built, the ground around the tree will be like concrete and won't absorb much water. The tree will have lots of character — character like that of a battlefield tree — but you won't want it.

*That* tree is as good as gone now! It would be best to cut it down now before the house next door is started. It can be "felled" into the vacant lot at little cost, but it will be really expensive to bring it down limb by limb between two houses. Why must it go? Let me show you: Observe where the excavation for the foundation has cut those big roots. What is going to anchor the tree when the wind blows? The roots on the other side will hold it, you say? Very well, but what happens when the basement is dug for the house next door? There will be scarcely any anchor roots left. Notice the wide area of feeder roots destroyed. Even if you could save the tree, the limbs on one side will rub against your house and that big limb on the other side will hang over your neighbor's house like the sword of Damocles — ready to drop at any time. A big tree such as that should be at least 20 to 30 feet from the house.

The group of trees over there might as well be taken out now. They look weak, have few fat buds, and have been having a tough battle against insects and our Rocky Mountain climate. The lack of water during construction will probably finish them off.

This will leave the nice trees over there. Yes, they are well away from the construction area, the roots haven't been cut, no limbs have been broken. One tree is even in a slight valley where it is catching some extra water — if and when it rains. I believe they should come through this construction period with little harm — except, (stop shaking your head; you knew I'd find you doing something wrong with these, too, didn't you?) doesn't this one look as though it is in a hole? How are you going to grade the lawn in this part of your yard?

You're going to fill two feet around the tree? That *will* kill it! No, I'm not crazy. Go ahead and fill around it, but save some money for removing the tree when it dies. Of course I know the trunk will stick up above the fill, but the tree roots need to breathe or, to be technical, the fill around the tree will impede the aeration that is essential to tree health.

Yes, it can be saved. Build a low, cement wall to form a shallow, broad "well" around it. I'd suggest that you make it a little larger than necessary and leave it open on one side for drainage. This wall should be about 18 inches high, which is sitting height, and you might even pave the shady side with brick, tile or flagstone on sand — no mortar. You will then have a charming sunken patio. If this wall can't be kept to 18 inches, make it higher and leave planting pockets for rock garden plants. Don't you think that this would make a delightful feature in your yard? It would be much more interesting than a flat lawn. What to some might seem a necessary evil is actually an asset. (See illustration.)

You defy me to find something wrong with the one remaining tree? All right, none of the problems that

we have been talking about seem to be present except the lack of water. But isn't it too high? Won't your grading expose the roots and leave the impression that the tree is growing out of a pimple? Now you're thinking! Your idea is excellent. Just move the driveway over here and build a dry-stone wall with plant pockets and an informal set of steps up to the house. That will not only leave undisturbed the natural grade of the area around the tree but will provide an inviting entrance from the parking area. The cars will be shaded, too, and they will not be conspicuous, being at a lower level.

Now, all that is needed is some ten-

der-loving-care until the trees get over the shock of changed growing conditions. This means the right amount of water, fertilizing, pruning, spraying, etc., as soon as you move in!

Then, enjoy your trees! Your house will be much cooler because of them. See how much more attractive it will be than that row of houses marching along over there without a single tree to break the monotony. And the slope of the lot is an asset, too — it is giving you a chance to make your yard much more interesting and livable. You'll be proud of your home and its outside appearance — thanks to those trees!



**TYPICAL PROTECTION FROM FILL**

To Apply Where Indicated on Plans and/or Staked by The Engineer.

**Protective Wall for Tree**

# Indoor Garden For Decorative Plants

HENRY M. CATHEY,  
Crops Research Division,  
Agricultural Research Service,  
U. S. Department of Agriculture

**Y**OU CAN GROW and display many kinds of decorative plants in your home by using an indoor garden. An indoor garden essentially is a planter equipped with high-intensity fluorescent lights.

The idea is not new. For years, houseplant growers — African violet enthusiasts in particular—have worked to develop ways of growing plants satisfactorily where there is little or no daylight. By acclimating the plants to a dimly lighted environment and by providing supplementary lighting with fluorescent tubes, these growers have been able to maintain plants indoors for long periods. But they have been hampered by lack of a light source that is suitable for plant display — a source that is high in intensity, that is not too hot for the plants, and that does not detract from the appearance of the surroundings. With the development of high-output (HO) panel fluorescent lights and very high output (VHO) fluorescent tubes, many of their handicaps have been overcome.

When grown in an indoor garden illuminated by these HO and VHO fluorescent lights, plants thrive — plants that barely existed indoors before the lights were developed.

To grow plants satisfactorily in an indoor garden —

- Water the plants only often enough to prevent wilting—then water thoroughly.

- Fertilize the plants every 2 to 4

weeks while they are actively growing.

- Illuminate the plants with HO and VHO fluorescent lights 12 to 16 hours daily.

## Lighting System

The lighting system for the garden using panel fluorescent lights consists of separate lamps, ballast, fixture and timer.

The panel fluorescent lamps are General Electric deluxe cool white (FP-12S/CW). They also are available in tints other than cool white. They require special connectors (ALF 510 series), which should be ordered at the same time the lights are ordered.

Rapid start ballast 7G3720 is required for these lamps. One ballast will operate two panel fluorescent lamps.

When you order lamps, ask the dealer if fixtures are available for them. If not, you will have to make your own or have them made.

## Selecting a Location

The best place to put an indoor garden is where the temperature during the day is about 75° and the temperature during the night is about 65°.

Avoid locations near heating ducts, exhaust fans, or doorways to the outside. Hot air from heating ducts heats and dries the plants. Cold air and drafts from exhaust fans and outside doors may chill the plants.

It's also a good idea to avoid areas of heavy traffic in the home. Not only is the planter often in the way where traffic is heavy, but plants in the garden are likely to be damaged by passing traffic.

### Stocking the Garden

The degree of satisfaction that your garden brings you depends, more than anything else, on your selection of plants for it — plants that are both attractive and adaptable to growing indoors. Your skill in arranging the plants that you select can add to your enjoyment of the garden.

Plants should not be planted directly in the indoor garden, but should be potted and the pots set in the garden. This method of handling the plants allows you to rearrange your garden periodically. And you can use seasonal plants in your garden — poinsettia at Christmas, azalea or tulips at Valentine's day, lily at Easter, hydrangea for Mother's Day, potted annuals during summer, or potted chrysanthemums in fall. Your garden should never remain static; it will soon become unattractive.

### Selecting Plants

Select plants according to the amount of light you are prepared to supply.

In general —

- Foliage plants need only be lighted from the top.
- Flowering plants must be lighted from the top and back of the indoor garden.

So if you want to use only the fixtures that are parallel to the planter and mounted over it, select foliage plants. If you are willing also to mount lighting fixtures on the standards so

the lamps shine forward onto the plants, you may include some flowering plants in the garden.

### Setting Plants in the Garden

Support large potted plants by setting them on other clay pots that are upended in the bottom of the planter box. Fill in around the upended pots with large gravel to a depth of 3 or 4 inches. Then fill the remainder of the planter box around the potted plants with unmilled sphagnum moss, pea-size gravel, or marble chips. Small potted plants can be plunged directly into the sphagnum or pea gravel.

Though the panel fluorescent lamps used in the garden are not as hot as incandescent lamps, they generate enough heat to harm plants that come in direct contact with them. Therefore, keep all plants at least 4 inches away from the panel lamps.

### Watering

Of all steps in the care of an indoor garden, watering is most important. If they don't get enough water, the plants dry out and die. If they get too much water, the plants drown or rot. The proper procedure is this: Water only often enough to prevent wilting — then water thoroughly.

As soon as you put plants in the garden, begin adjusting them to their new indoor environment. Water the soil ball, clay pot and surrounding sphagnum moss to saturation. But don't flood it. Then allow the whole garden to dry until the plants are near wilting. You can detect wilting early by watching the leaves; they change from green to grey-green and begin to droop.

When the plants begin to wilt, water thoroughly again.

*Excerpted from U.S. Govt. Bulletin.*

# Annual Plant Sale

**Annuals** — Cockscomb, verbena, periwinkle, pansies, coleus, marigold, double gaillardia are only a few of the annuals selected for the plant sale on the basis of their performance in test trials at Denver Botanic Gardens, their popularity and hardiness in Denver City Parks or success and excellence experienced by practicing gardeners.

---

**House Plants** — As a cherished Mother's Day gift, to complement a favorite planter or to delight a greenhouse hobbyist, unusual house plants have been chosen with the assistance of conservatory experts especially for the 1966 plant sale, May 6 and 7.

---

**Rock Plants — Ground Covers** — For the sun-parched slope or protected shady nook, more than 50 kinds of rock plants and ground covers will be sold at this specialized booth. Information as well as plants, from na-

tive pussytoes and hollygrape to silver-edged spurge, runnerless strawberries and ground-hugging junipers, will be found here. Let's grow together at Denver Botanic Gardens Annual Plant Sale, May 6 and 7.

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**Petunias** — Among the dozen outstanding varieties selected for the 1966 plant sale is 'Sunburst', the best yellow petunia tested at Denver Botanic Gardens last year. About 100 varieties of petunias are tested here annually; petunias offered are the best of these test trials. 'Seafoam', 'Improved Comanche,' and 'Lyric' continue to excel and are chosen in a complete color range.

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**Children's Corner** — Little plants for little people are planned especially to stimulate interest among young gardeners. Prices, too, are little in the Children's Corner at the Annual Plant Sale, May 6 and 7.

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A botanic garden is a collection of growing plants, the primary purpose of which is the advancement and diffusion of botanical knowledge. This purpose may be accomplished in a number of different ways with the particular placing of emphasis on different departments of biological science.

The scientific and educational work of a botanical garden center around the one important and essential problem of maintaining a collection of living plants, both native and exotic, with the end purpose of acquisition and dissemination of botanical knowledge.

# *The Green Thumb*



Conservatory  
Issue

THE COVER    Edna C. and Claude K. Boettcher Memorial Conservatory  
Denver Botanic Gardens York Street Unit  
Formally Dedicated January 15, 1966

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# *The Green Thumb*

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For further information write to the Membership Chairman, Mrs. William Stanley, 3800 East Long Road, Littleton, Colorado 80120 or call 771-3617.



## *The Boettcher Memorial Conservatory*

MARILYN HOLMES

**I**F YOU HAVEN'T visited the new Edna C. and Claude K. Boettcher Conservatory, you're in for a real treat, for it's one of the most fascinating new buildings on the Denver skyline. Located strategically between Ninth and Eleventh Avenues on York Street, it overlooks both Cheesman Park and the front range of the Rocky Mountains. In addition to its intriguing design, the Conservatory is of particular botanical importance to Denver area residents. It is the only such facility between St. Louis, Missouri, and the west coast.

The vaulted-arch structure is 72 feet wide, 160 feet long and 51 feet high. There is a large lobby which houses a gift shop, coat rooms and a reception area. The quarter-acre of ground in-

side the Conservatory is graded to various levels to create a natural and more interesting setting. Informal paths lead the visitor up, down and around the jungle-like terrain where both small and large plants — approximately 800 different kinds of tropical and semi-tropical specimens—create a truly tropical atmosphere. Trails, streams, pools and waterfalls add variety and authenticity to the natural setting. The Conservatory, with its lush beauty, provides a special retreat — both in the dry, hot summer as well as in the snowy, cold winter — for Colorado residents and out-of-state visitors, and a living laboratory for students of botany. Since the formal opening in January, the Conservatory has become an additional

“must” on the weekend zoo-and-museum-circuit for parents with small children.

Donated by the Boettcher Foundation, the Conservatory was designed by the architectural firm of Hornbein and White and built by Gerald H. Phipps, Inc. The building design is based on an upside-down catenary curve, much like the cables of a suspension bridge. The two principle materials used were reinforced concrete and one-quarter-inch plexiglas. The interlacing concrete ribbons of the superstructure were poured in place into plywood forms supported by a wooden framework. The pyramid-shaped plexiglas domes were preformed, and are of varying dimensions from eight feet square to a 17-foot long “diamond” shape. They are specifically designed to gather condensation water and lead it through “weep holes” to the outside. The weight of the structure is supported by 116 concrete caissons which penetrate the earth to a depth of 25 feet.

To create the special conditions needed for the preservation and growth of the tropical plants, there are 39 large fans arranged around the perimeter of the Conservatory which draw air in through the decorative grills and circulate it among the plants. The boilers are fired with natural gas, with stand-by oil-burning equipment. The building is completely air-conditioned and humidified by an evaporation-type cooling system. Moisture is also provided by hand-watering of the plants. The low-level lily pond, to the left as you enter, is heated independently to insure a water temperature of about 80-degrees Fahrenheit, which is needed by certain tropical water plants.

The concrete lamp posts inside have a dual purpose: for night lighting (so that the Conservatory may be open at night) and to hide wiring and fans.

Ten fans are concealed in the bases of the posts which pick up air from the ground surface and blow it out the top of the hollow lamp posts. There are also thermostats on each post to regulate temperatures nearby. Through this installation the temperature may be varied from area to area depending upon the local conditions needed.

Two working greenhouses adjoin the Conservatory on the west, where plants are propagated and grown for display in the Conservatory. Connected to the greenhouses are two laboratories for special classes.

The educational features of the Conservatory are augmented by a continuous exhibition of colored slides shown in the lobby. These slides show tropical plants growing in conservatories and tropical gardens in other parts of the United States. The projector used in this program is a gift from the Denver Assistance League.

The gift shop in the lobby is operated by the Associates of Denver Botanic Gardens, a volunteer organization. Profits from sales in the shop are used for the benefit of Denver Botanic Gardens. All items for sale must pertain to horticulture, and include such things as books, flower arrangements, small garden accessories and hand-made craft items. It is possible that the south room, now serving no specific purpose, may be used as a restaurant or tea-room in the future. If this idea becomes a reality, the plan would include an open-air dining area above the south room at the southeast corner of the Conservatory.

The Conservatory is now open on Fridays from 9:00 a.m. to 9:00 p.m.; all other days from 9:00 a.m. to 5:00 p.m. Mr. Ernest Bibee is the Conservatory Superintendent. Free guided tours can be arranged by calling the Conservatory number: 297-2348.



# *A Bit of* Tropical Ecology

MORAS L. SHUBERT  
*University of Denver*

OUR MAGNIFICENT new Conservatory provides us with a sample of the tropics, so let's improve our understanding of the tropical environment. Many of us immediately get a mental picture of a "Tarzan-movie-type" jungle, but others imagine lots of beautiful showy flowers like orchids, hibiscus, bird-of-paradise and the like.

Actually, the vegetation of the tropics is as varied (if not more so) as we find in our more familiar temperate climate of the middle latitudes. We are familiar with the vegetational diversity, from steamy deciduous forests of the eastern states to the grasslands of the midwest and cold deserts of northern Nevada, yet we have little objection to classifying them all as temperate, because all of these have fluctuating warm and cold seasons, and the differences in the vegetation depend upon the amount of water available.

So it is in the tropics. The real criterion for calling a climate "tropical" is the absence of any cold season. In

the true tropics it never frosts, so the growing season is year-long, provided there is enough moisture. Thus we find that the tropics are sub-divided into moisture-availability subdivisions just as the temperate region is. Where there is always plenty of rain — where they say that "the only variation is from wet to very wet" — we find the tropical rain forest. It is an almost impenetrable thicket of trees and vines growing so close together that even at midday it is quite dark close to the forest floor.

Here, there are several "societies" of trees living together with the tallest standing like sentinels overtopping the others by perhaps ten to twenty feet. Then there is the top story of a tightly-closed canopy of trees which shade and shelter others that grow beneath them in one or two other layers. We find species of great economic importance in all classes of these. It is an interesting fact that when they wish to cut trees for lumber in such a forest that it is sometimes necessary to cut many of them at the same time because they are so well tied together by vines that a whole group may have to be felled to get any of them down.

A tree such as cacao, from which we get chocolate, is an interesting dweller of the lower levels. It even has a peculiar type of flowering that is an

adaptation to the dark environment where it lives. Its flowers are pollinated by insects which work in comparatively dim light, and the flowers are displayed in the comparative open space on the main stems, rather than at the tips of stems where we usually look for flowers.

Besides the tropical rain forest, there are monsoon forests where the seasons alternate each year between a very dry period and a very wet one. In other areas that are still drier, we find open grasslands and savannas with widely spaced trees. Of course, the driest of all, is the tropical desert.

From the wide range of environmental conditions in these varieties of tropical climate, we can see that the vegetation types are remarkably different as we go from one to the other. Considering, also, that the greatest assemblage of different plant species per square mile is found in the tropical rain forest, we can see why the tropical region is an extremely rich source of plants that are of value economically and aesthetically.

Had it occurred to you that we maintain a tropical environment within our homes? By the use of heat in the winter, we have no "frost" in our homes, so the house plants we grow in them are frequently of tropical origin. One of the chief reasons for the success of the various members of the philodendron family is that they are adapted to deep shade, erratic watering schedules, and warm temperatures.

So, when we look for interesting and beautiful plants for a tropical conservatory, we find that the list of species is an almost staggering one, and almost as many more remain hidden in the far corners of the tropics yet to be discovered. In the management of a conservatory we find that by the use of our knowledge of ecology we can find



suitable locations for an amazing array of species within a small area. We can find spots where it is sunny and hotter and drier for natives of the thorn forest, for example, or we can create shady spots beneath the taller trees that will be ideal for the understory species of the rain forest. Although palm trees are exciting enough to have a special collection of them, they should be considered only a stage in a progressive succession of plantings in our major conservatory collection. They are ideal for the quick shade and space-filling qualities they provide until the broadleaf tropical species begin to replace them.

All who visit the conservatory again and again will be able to observe that, in this sample of the tropics sitting in an environment that is forbidding to its inhabitants, the integrated community will gradually develop. But even more important is the fact that, as time goes on, the growing collection will undergo certain changes that will provide for continuing excitement.

# Superintendent of the Conservatory

## Mr. Ernest A. Bibee

H.M.V.

THE AVERAGE visitor who strolls amidst the fragrant — the quiet — beauty which surrounds him in the Conservatory, can have but a vague comprehension of the amount of skill, planning, foresight, energy, and the many nights of sleeplessness which help form the background for the impressive and tranquil tropical display he sees. Appreciation must be expressed to Mr. Ernest Bibee for his remarkable workmanship in the selection of the plant material and planting and maintenance of the plants in the Conservatory.

Mr. Bibee became a member of the Denver Botanic Gardens staff in February of 1965 with a very impressive record in the field of tropical plant culture. He has already demonstrated his ability here. The Herculean task of having the building ready for its formal dedication in January of 1966 was successfully completed by him despite many obstacles which seemed to “divide and multiply” as the deadline approached.

A précis of Mr. Bibee’s experience and background will most certainly be

----- CUT HERE -----

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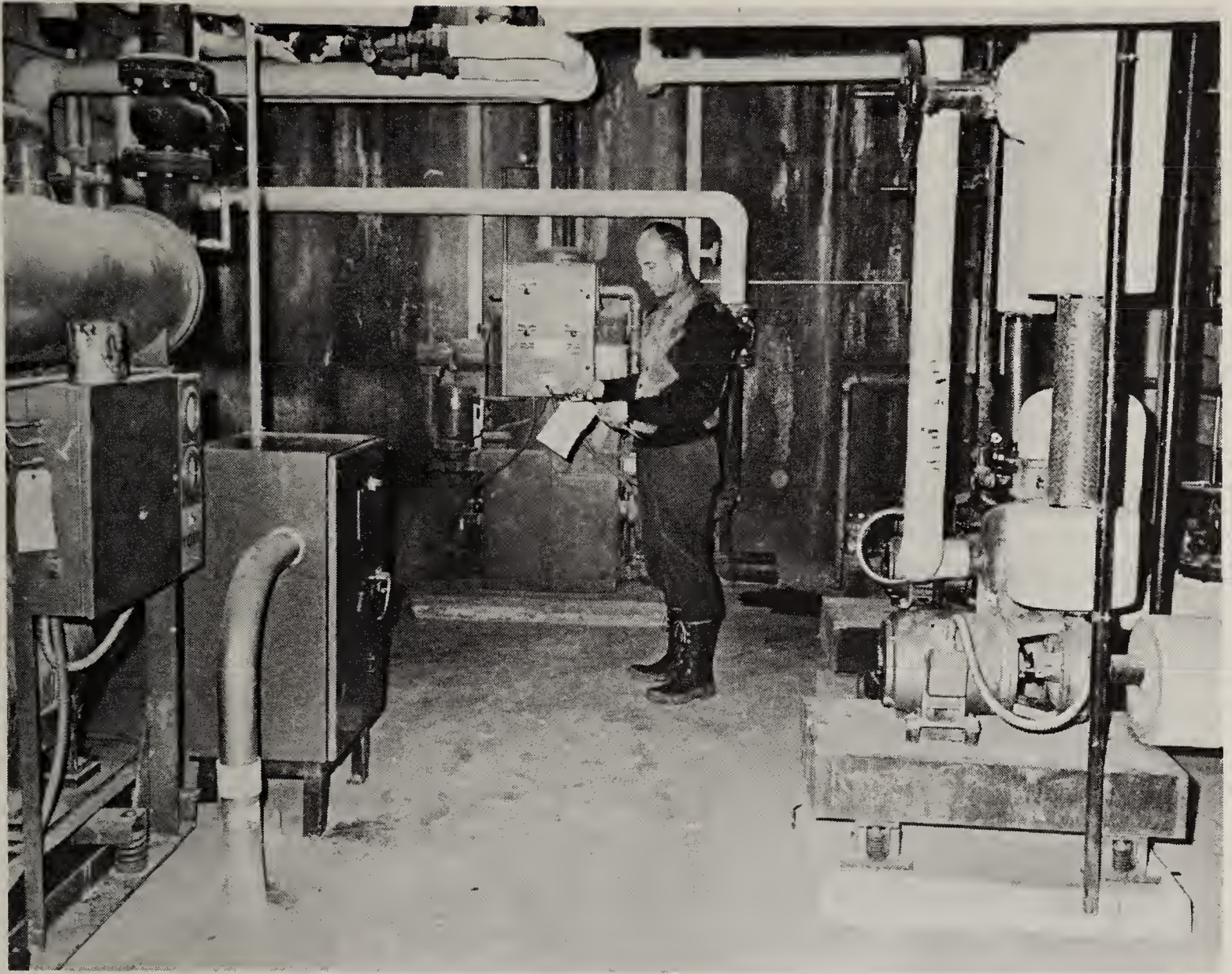
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Conservatory Superintendent, Ernest Bibee, making a routine check of the temperature and humidity.

of interest to those who have admired his handiwork in the Conservatory. Prior to his arrival here, he acted as Horticulturist at the Missouri Botanical Garden Climatron for 3½ years and also lectured in the night division of the Botany Department at University College, Washington University, for 1½ years. He has spent many years in training in the field of horticulture and received his M.S. degree in Sub-Tropical Horticulture at U.C.L.A. in 1949. Subsequently, he developed his knowledge and skills in his chosen field through studying, teaching and by employment with companies in business of a horticultural nature.

He has already made his debut on the educational scene in Denver by conducting a Horticultural Science class

at the University of Denver during the winter of 1965-1966. In addition, he attended a short course in Business Administration under a grant from the Intergovernmental Career Development Program and has received a fellowship to pursue this study.

He is much in demand as a speaker on the subject of tropical and sub-tropical plants and has a remarkable collection of colored slides of these plants which he uses to illustrate these lectures.

Despite the rigors of such a full schedule, which includes constant supervision of the Conservatory, Mr. Bibee remains always affable and humorous and more than generous in sharing his knowledge with the many people who have questions about indoor plant culture.

# PLANTS OF SPECIAL INTEREST

## *Now Growing in the Conservatory*

**1L. LOQUAT** (*Eriobotrya japonica*)

China  
Rosaceae

Tree widely cultivated for its fruit and as an ornamental. Foliage is dark green and roughly veined; flowers fragrant, white and in hairy clusters. The small fruit is globose to pear-shaped, firm-fleshed and juicy. It ripens mostly in winter and early spring. The fruit varies in color from pale yellow to orange and may be eaten fresh like an apple or utilized in the making of jellies, preserves and pies.

**2L. FALSE PALM** (*Ficus pseudopalma*)

Philippines  
Moraceae

This is a strikingly distinct species of the Mulberry Family. The tree may grow to twenty feet high. It has thin, leathery, palm-like leaves. The stiff foliage clusters near the top. A single unbranched stem may be tipped with glossy leaves, two or three feet long, which are tapered toward the base and are coarsely notched.

**3L. CAROB OR  
ST. JOHN'S BREAD** (*Ceratonia siliqua*)

Mediterranean  
Leguminosae

Flattened leathery pods up to one foot long are familiar as St. John's Bread (the "Wild Locusts" of St. John the Baptist). This evergreen tree has shining leaflets and small red flowers (without petals) in short lateral racemes. The seeds are surrounded by a sweetish pulp. *Ceratonia* is from the Greek for horn, in allusion to the fruit.

**4L. DOUBLE ALLAMANDA** (*Allamanda cathartica*)  
*williamsi*

Brazil  
Apocynaceae

Handsome climbing shrub, often climbing to forty feet high. The leaves, which are elliptic-oval, six inches long and glossy light-green, come in fours forming a cross. The trumpet-shaped double flowers, about three inches across and appearing in clusters, are golden-yellow. Used as a cathartic.

**5R. OLIVE** (*Olea europaea*)

Mediterranean  
Oleaceae

The olive is one of the longest-lived and most beautiful of all fruit trees. It has a spreading top and thornless branches. The leaves are elliptic, one to three inches long, green above, silvery and somewhat scurfy beneath. Small, fragrant white flowers grow in clusters. The tree is grown for its drupes which yield oil and are prepared as a food and condiment.

**6R. JERUSALEM THORN** (*Parkinsonia aculeata*)

Tropical America  
Leguminosae

A palo-verde with drooping yellow-green zigzag twigs, having ten inch streamers, which, for a short time, carry about thirty tiny leaflets. Particularly picturesque is the mustache phase, referring to the bunches of dry leaves hanging on until the

rain brings out a new crop of green leaves. The attractive golden-yellow flowers (in loose clusters) have a special, upper, red-spotted petal which turns red with age.

**7L. AVOCADO** (*Persea americana*) Tropical America  
Lauraceae

One of the best trees for the double purpose of fruit and ornament. It is medium to large size and of compact form. Leaves are laurel-like; flowers small, greenish and in dense terminal clusters; fruit green or olive-colored, long-stalked and pear-shaped. The fruit contains up to 39% oil and is rich in vitamins. Avocados are a very profitable crop as the trees begin to bear when four or five years old; many continue for fifty years and may produce as many as five hundred fruits annually.

**8L. GOLD TREE** (*Tabebuia argentea*) Paraguay  
Bignoniaceae

This tree brightens the blue sky when its clusters of pure gold blossoms are seen against it (often called the "Sunshine Tree"). The light-grey trunk is smooth and the branches lift high in the air. The irregular tube-shaped flower has five crepe-like lobes. The fine lightweight timber used for interior decorating is in such demand that the tree is becoming rare in Central America.

**9L. BRAZILIAN PEPPER** Brazil  
**CHRISTMAS BERRY** (*Schinus terebinthifolius*) Anacardiaceae

This tree, which is a cousin to the pepper tree, has the same pungent, peppery smell. It has graceful, hanging branches with filmy leaves, dark above and lighter below. Small flowers appear in summer in greenish-yellow clusters. Bright red, berry-like fruits form in the fall and last until January. These berries are used for Christmas decorations. The old trees assume gnarled and twisted forms, but young trees are more like shrubs. Berries are eaten and distributed by various species of birds.

**10R. BUDDHA'S BELLY BAMBOO** China  
(*Bambusa ventricosa*) Gramineae

The bamboos comprise a large genus of often gigantic, woody, hollow-stemmed and, chiefly, tropical grasses which are grown for ornament and for innumerable uses in the tropics. Buddha's Belly Bamboo, so-called because of the characteristic dark olive culms between internodes, may grow to fifty feet high and have leaves up to seven inches long.

**11R. CEYLON GOOSEBERRY** (*Dovyalis hebecarpa*) India & Ceylon  
Flacourtiaceae

Old world tropical shrub or small tree with spiny branches and leaves three or four inches long. The male and female flowers are inconspicuous and usually grow on separate plants, but both must be present for fruits to develop. The fruits, one inch in diameter, are deep purple in color, velvety from short green hairs, and resemble a ripe gooseberry. Useful for screening when kept pruned.

**12R. CAMPHOR** (*Cinnamomum camphora*) China & Japan  
Lauraceae

Aromatic tree which is the source of commercial camphor. The thick glossy leaves, which are distinctly three-veined and whitish below, have a strong scent of

camphor when bruised. The young unfolding leaves are a soft, rose-pink shade and quite outclass in beauty the small yellow flowers which come in short clusters in the leaf axils. Camphor is obtained by steam distillation of the clippings, wood and, sometimes, the leaves.

**13L. YESTERDAY-TODAY-  
and-TOMORROW** (*Brunfelsia calycina*) Brazil  
Solanaceae

A woody, slow-growing shrub with two types of leaves, one pointed and smooth and the other tending to a blunt tip and often twisted. The shrub is covered at intervals during summer and autumn with sweet-scented flowers of three colors: blue, lavender and white. Various coloring is due to the fading of the flowers. The common name was derived because of this peculiarity.

**14L. HONDAPARA** (*Dillenia indica*) India  
Dilleniaceae

Handsome medium-sized tree of the old world. Its leaves are oblongish, coarsely-toothed and nearly twelve inches long. Prized for its fragrant, magnolia-like flowers, which are found solitary at the ends of the branches. The flower is pure white, seven inches across, with a mass of golden stamens. Fruit hard, about three and one-half inches wide, greenish, the fleshy part being the enlarged calyx. It is pleasantly acid, resembling an unripe apple, and is used in making jelly, cooling drinks and curries.

**15R. VARIEGATED AGAVE** Central America  
Amaryllidaceae  
(*Agave angustifolia marginata*)

There are many species of agaves or "Century Plants". The thick, fleshy, sharp-tipped leaves form a basal rosette. Some of the larger species may require ten to twenty years to store enough plant food to produce the sturdy, fast-growing flower stalk. After blossoming, the exhausted plant dies. *Angustifolia* refers to the majestic foliage and *marginata* to the striped margin.

**16R. BOTTLEBRUSH** (*Callistemon viminalis*) Australia  
Myrtaceae

This tree, with a scaly bark and willowy branches, often grows to sixty feet high. The leaves are light green, four inches long and, when young, are covered with bronze hairs. Cylindrical spikes of bright red flowers, suggesting the brushes used to clean bottles, are responsible for its common name. The inflorescence, of which the stamens are the most conspicuous part, appear at the branch ends. The branches and flowers droop and sway pendulously — the effect much like a weeping willow.

**17R. COMMON FIG** (*Ficus carica*) Mediterranean  
Moraceae

Irregularly branching tree with light-grey bark, usually not over twenty-five feet high. The leaves are deeply grooved, rough above and hairy beneath. The fig is a syncarp, a fleshy receptacle, inside of which are scores of minute male and female flowers which bloom and mature in the dark interior. The female flowers, if pollinated by the fig wasp, develop into the seeds familiar in the commercial fig. "Brown Turkey" is the variety most grown in Hawaii, with purplish-skinned fruits, soft pink flesh and good flavor. Several varieties are established in the Conservatory.

**18L. YELLOW POINCIANA** (*Peltophorum inerme*) Indo-Malaya  
Leguminosae

Upright tree with spreading top and thick foliage has fern-like leaves which are twice compound and rusty-hairy. Tight bronze buds when fully open have crinkled, golden petals and orange-tipped stamens. The pods are flat and broad with a narrow wing down one side. The distinct green color of the foliage and the large, erect panicles of bright yellow, fragrant flowers make this an object of beauty, resembling the Royal Poinciana, except for the yellow flowers.

**19L. FLAME OF THE FOREST** (*Butea monosperma*) India to Burma  
*frondosa* Leguminosae

Slow-growing deciduous tree which, most of the time, is an undistinguished, distorted tree with hard, leathery, trifoliate leaves. In February, the leaves are shed and then begins a riot of vermilion bloom. Clusters of pea flowers, red, tinged with orange, hang from the leaf axils and branch, softly hairy, so that they shine and shimmer in the sun. A coarse, fibrous material is obtained from the inner bark and used for caulking seams of boats. The dried flowers yield dye.

**20R. CENTURY PLANT** (*Agave potatorum*) Mexico  
Amaryllidaceae

Trunkless plant which belongs to the Amaryllis family has rosette of tough, marginally prickly leaves, which are grayish and with tips pointed and recurved. Fragrant flowers, yellowish-green, are borne on horizontal branches at the top of a stalk thirteen or more feet long. It is an erroneous belief that it blooms only when one hundred years old.

**21R. DATE PALM** (*Phoenix dactylifera*) W. Asia or N. Afr.  
Palmaceae

Massive, tall palm, up to one hundred feet high, which usually produces suckers at the base. Leaves are gray-green, erect when young, but stiff and drooping in age. Female trees will produce from one hundred and fifty to two hundred pounds of fruit per year and may be productive for eighty to one hundred years. This is the palm of the Bible. When Christ made his triumphal entry into Jerusalem, palm branches were strewn along the way by the population.

**22L. INDIAN EBONY PERSIMMON**  
**CHOCOLATE PUDDING FRUIT** W. Indies and Mexico  
(*Diospyros ebenaster*) Ebenaceae

Tree cultivated in hot, humid climates is a close relative of the American persimmon and also the old world ebony. The bark is blackish; leaves dark green, glossy, somewhat leathery, and three to six inches long. The small whitish flowers are fragrant and occur in groups of three to eight in leaf axils. The fruit, which is olive-green, up to five inches long, has chocolate-brown flesh which is sweet. Fruit common in Mexican markets in late winter. Timber used for cabinets.

**23L. EVERGREEN SNOWBALL** India to Japan  
(*Viburnum odoratissimum*) Caprifoliaceae

Beautiful evergreen shrub to ten feet high which grows in a cone-shape with lustrous foliage and dense branches. Leaves are glossy, dark green, with pale midrib and lightly crenate margins. The large, fragrant, white flower trusses,

which are about four inches high, are produced in March and April, followed by red fruit; later turns black.

**24L. FLAME OF THE WOODS** East Indies  
**JUNGLE GERANIUM** (*Ixora coccinea*) Rubiaceae

Bushy, small evergreen shrub with rich green, firm, obovate leaves and showy, tubular flowers which are waxy, orange-red, with spreading lobes. No shrub is more prolific in brilliant bloom. The great snowball heads of flowers often completely cover the plant. It serves as a hedge, specimen or base planting material. Several varieties are established in the Conservatory.

**25R. CHEWING GUM TREE** (*Achras zapota*) Central America  
Sapotaceae

Important evergreen tree which furnishes durable wood, latex for making chewing gum, and excellent fruit. Upright, slender tree, seventy-feet high; leaves stiff and glossy-green; flowers small, pinkish-white. The fruit is light brown in color, inside and outside, with black seeds. The milky juice or chicle used in making chewing gum is obtained by tapping trees every two or three years. Each tree yields about sixty quarts of latex.

**26R. SLOTH TREE**  
**PUMPWOOD or SNAKEWOOD** South America  
(*Cecropia palmata*) Moraceae

Large tree with foliage crowded near the extremities of the big branches. Leaves similar to the castor plant, very long-stalked, deep green above and silvery-white beneath. The greenish-white flowers are in dense catkins. Common names derived because the cut trunks, being hollow, are used for conducting water by the native inhabitants. The tree contains a sweet, milky sap and sapsuckers often girdle the trunk with holes to enjoy its delicacy.

**27R. MANGO** (*Mangifera indica*) East Indies  
Anacardiaceae

Stately, decorative evergreen with rounded top. Newly-leafed portions have a coppery-red color. When mature, the leathery, dark green leaves emit the odor of turpentine when crushed. Attractive, large, yellowish, filmy flower clusters are followed by red and yellow fruits, which may grow to four or five pounds. The flesh is yellow or orange around a very large, flat seed and tastes like a deliciously resinous peach. The most delicious of all tropical fruits and very aromatic.

**28R. FISHTAIL PALM** (*Caryota mitis*) Malaya  
Palmaceae

Decorative palm which grows in a clump and has graceful fronds up to twenty-five feet high. Ringed brown trunks are smooth after the leaf-sheaths have fallen. The triangular leaflets, spreading at their tips like fish tails, give the common name. At maturity, it bears flowers in leaf axils in plumes suggesting horses' tails. A wine is extracted from the seeds of some species.

**29R. BANANA** (*Musa sapientum*) India  
Musaceae

A tree-like, fleshy-stemmed herb up to twenty feet high with leaves five to ten feet

long. Flowering spike drooping, its bracts purplish-violet, the flowers yellowish-white. The fruits, among the most popular of the tropics, turn yellow when ripe and are sweet and seedless. They are borne one hundred or less in the cluster. Each plant bears one bunch, then dies, and the new shoots around the base grow into another plant.

**30L. SNOW QUEEN HIBISCUS** (*Hibiscus matensis*) E. Indies  
Malvaceae

Hibiscus is an important genus of over two hundred species of herbs, shrubs and trees of the mallow family. Vigorously branching shrub with willowy, reddish stems, dense, with rough, ovate, toothed leaves, grayish-green, variegated mainly towards margins with creamy-white. Single, three-inch flowers, carmine-red, with crimson veins in center. Hibiscus is Virgil's name for mallow.

**31L. JACARANDA** (*Jacaranda acutifolia*) Brazil  
Bignoniaceae

Since blue is the rarest color in the flower world, the Jacaranda attracts attention. It is a large tree with light gray bark. It is sometimes known as the fern tree for each leaf is double pinnate with spreading complexity of tiny leaflets. The lavender-blue flowers, which appear in large, loose clusters, are shaped like bells, with two lips, one with two lobes, the other with three. The blooms fall in masses, making a carpet of color under the tree.

**32L. CHENILLE PLANT** (*Acalypha hispida*) East Indies  
Euphorbiaceae

A strange looking tropical shrub having velvety red tails up to eighteen inches long which resemble chenille for which they are named. Also called "Red-Hot Cat-tail." The plant has bright-green, rather pointed leaves. Its dark red flowers are pistillate with no petals. Plant used medicinally in East Indies. *Acalypha* was applied by Hippocrates to a nettle.

**33L. EASTER LILY TREE** (*Chorisia insignis*) Peru & Argentina  
Bombacaceae

Tree with an overfat trunk sometimes up to six feet in diameter; its smooth, green bark covered with stout spines or cones, which sometimes disappear as the tree ages. The crown is open and sprawling; the leaflets arranged in finger-fashion. Flowers, suggesting an Easter Lily, are trumpet-like with whitish-yellow petals, or yellow petals with chestnut-colored blotches.

**34L. THREAD PALM** (*Washingtonia robusta*) Lower Calif. & Mexico  
Palmaceae

Tall, slender fan palm which may become over one hundred feet tall. Upper part dense with living, bright green, glossy and persistent, dead, brown foliage which forms a skirt; the plaited leaves are stiff and slightly cut. Fruit is dark brown. Its most distinguishing feature is the thread-like filament around the outer extremities from which it gets the common name. Also, "hula palm."

**35R. BLOOD BANANA** (*Musa zebrina*) Java  
Musaceae

Slender plant up to twelve feet high with tall trunk, bearing rather delicate, long-stalked leaves which are satiny, bluish-green and richly variegated with blackish blood-red. The channeled midrib is brown-red, underside reddish-wine.

**36R. ANT FEEDER TREE** South America  
**TRUMPET TREE** (*Cecropia peltata*) Moraceae

Tree with awkward horizontal branches, carrying long-stalked, hand-shaped leaves at their tips, and having a prominently ringed trunk. Flowers are very small, in cylindrical heads, many arranged in a star shape. The hollow trunks are the home of ants which feed on the small protein sacs at the base of the leaf stalks. Also used for making a kind of trumpet. *Cecropia* in Greek means "wind instrument."

**37R. COCO-PLUM** (*Chrysobalanus icaco*) S. Fla. to Brazil  
Rosaceae

This dense, native evergreen, although sometimes thirty feet high, is found more often as a large, spreading shrub. It has thick, leathery leaves and white flowers in small clusters. The fruit, a fleshy, yellow or blue drupe about one inch long, is dry and insipid, but sometimes used for preserves. *Chrysobalanus* is Greek for golden acorn, in allusion to the fruit.

**38R. PUNK TREE** Australia  
**CAJEPUT** (*Melaleuca leucadendron*) Myrtaceae

Large, conspicuous tree having ferny foliage and remarkable light-colored, pale buff, spongy bark which flakes off in thick, papery flakes. Covers itself with masses of honey-laden, creamy-white, fluffy flowers in terminal spikes up to six inches long. The leaves yield green, aromatic cajeput oil used in medicine.

**39R. GUMBO LIMBO** Tropical America  
**NAKED INDIAN** (*Bursera simaruba*) Burseraceae

Balsamiferous tree with its tortuous branches often scantily provided with foliage. Most noticeable feature is its coppery-red, smooth bark, which gives it the common name "Naked Indian." It bears a greenish berry enjoyed by the birds. Also yields a sweet aromatic balsam known as Gomant resin which supplies the gum elemi of the druggist.

**40L. QUEEN PALM** (*Arecastrum ramonzoffianum*) Argentina & Bolivia  
Palmaceae

Handsome, ornamental palm with a tall, smooth trunk, gray, ridged with leaf scars and visible growth rings. Has graceful crown of long, arching, plummy fronds. The flowering clusters produce fruit with sweet-tasting, orange pulp. The inside seed, suggestive of a tiny coconut, sometimes called "Monkey Nut," is used for leis and earrings.

**41R. PEPPER** (*Piper unguiculatum*) East Indies  
Piperaceae

Large genus of mostly tropical herbs, shrubs, and woody vines, very largely aromatic and of little horticultural but much economic interest. This variety is a close relative of the true pepper, *P. nigrum*, which yields both black and white pepper. Leaves alternate, flowers simple, minute, crowded on catkin-like spikes, without petals or sepals, fruit a small berry.

**42R. LOFTY FIG** (*Ficus altissima*) India  
Moraceae

Large, dense, evergreen spreading tree with few aerial roots; leaves thick, leathery,

broadly oval with short tip and ivory veins. Attractive clusters of orange-red fruit. Called "Council Tree" in Java because the chiefs in olden times held their councils beneath its enormous crown.

**43L. ROYAL PALM** (*Roystonea regia*) Cuba  
Palmaceae

One of the most spectacular palms is this feather palm. The stone-gray trunk often shows a gradual swelling about halfway between the ground and leaf-crown, as the tree does not continue to grow in thickness where the leaves have dropped off. When the long, drooping leaves wither and fall, they leave scarcely a mark on the trunk.

**44L. HOG PLUM** Central America  
**AMBARELLA** (*Spondias cytherea*) Anacardiaceae

Upright tree with furrowed trunk common throughout Tropical America, sometimes reaches a height of sixty feet. Leaflets are ovalish, three to four inches long, and the flowers are purplish-green. Fruit, egg-shaped, one to one and one-half inches long. The yellow, plum-like fruit stains whatever it falls on. Fruit has a tart, pineapple flavor. Makes excellent preserves. Has a large seed.

**45L. GLORY-BUSH** Brazil  
**PRINCESS FLOWER** (*Tibouchina semidecandra*) Melastomaceae

Usually a shrub, though frequently ten feet high. Long, ovate leaves are densely hairy on both sides and pale beneath, giving a soft, gray-green, velvety appearance. Magnificent violet flowers up to five inches across have five velvety petals and ten stamens in two sizes, with long, curling purple anthers that resemble a spider on its back. Flowers throughout the year. Fruit a five-valved capsule, surrounded by the calyx tube.

**46L. DWARF BANANA** (*Musa cavendishi*) So. China  
Musaceae

This dwarf Chinese banana, grown chiefly for ornament, is usually not over six feet high. The leaves have a bluish-green color or red-spotted when young; flowering spikes, drooping, with reddish-brown bracts. The fruits are very numerous, often two hundred on a stalk. They are edible, somewhat curved, fragrant and mostly seedless.

**47L. CORKSCREW CROTON** (*Codiaeum variegatum*) So. India Ceylon  
Euphorbiaceae

Croton includes about seven hundred species distributed throughout the tropics. Sturdy plant, dense, with stiff, erect, strap-shaped leaves typically twisted and spiraled; color, deep green and metallic-red with yellow in shady location; becoming more vivid in strong light in shades of golden yellow, pink, red, bluish-black and green; midrib usually yellow.

**48L. SCREW PINE** Madagascar  
**TOURIST'S PINEAPPLE** (*Pandanus utilis*) Pandanaceae

Spectacular tree, growing to sixty feet in the tropics, with stilt-like prop roots arising fifteen feet from the ground. The leaves, bluish-green with red spines,

grow in a spiral rosette. In young plants, they grow from the trunk in ascending spirals, hence the name. Female trees have a hard, pineapple-like fruit at the ends of the branches. The male tree flower is a drooping whitish plume. The leaves, when dried and prepared, are woven into mats and numerous other articles.

**49R. BAMBOO PALM**

**GOLDEN FEATHER PALM**

(*Chrysalidocarpus lutescens*)

Madagascar  
Palmaceae

This palm is one of the most popular of tub plants. Many yellowish and greenish stems and light green leaves form thick clumps. The light coloring is its outstanding feature. Stems are smooth, ringed, about three inches in diameter on large plants, thus the name bamboo or cane palm. Feather-type leaves are long and arching. Fruits are yellow.

**50L. GARDENIA** (*Gardenia taitensis*)

Tahiti  
Rubiaceae

A genus of over fifty species of tropical old world shrubs and trees belonging to the same family as coffee. They have opposite, evergreen leaves, one of which is found in threes at a single joint. The *Gardenia taitensis* shrub is not so compact as *G. jasminoides* (the florists' gardenia) and is somewhat less fragrant. It has a single, heavy, waxen, creamy-white, star-like flower with five to nine petals arranged like a pinwheel.

**51L. GOLDEN TRUMPET**

(*Allamanda cathartica hendersoni*)

Brazil  
Apocynaceae

This variety of *Allamanda* differs from the original species, *A. cathartica*, in that its leaves are not hairy beneath, but smooth, pointed and light green. Also, its flower buds are brownish in color and look as if they had been varnished. Large, velvety, bright-yellow flower, five inches across has blotches of brown on the petals and streaks in the throat of the tube.

**52L. DOMBEYA** (*Dombeya elegans*)

Madagascar  
Sterculiaceae

Extremely showy shrub belonging to the same family as chocolate. It is of dense, compact form; leaves angularly lobed, long-stalked, but somewhat smaller than *Dombeya wallichii*. Plant makes a perfect mound of pink flowers at every terminal. The genus *Dombeya* received its name from Joseph Dombey, a botanist of the 18th century.

**53L. JAVA PLUM** (*Eugenia jambolana*)

E. Indies  
Myrtaceae

A graceful, drooping tree, attaining forty feet in height. Leaves (which fall constantly) are a dull, light green, three to eight inches long, and pointed. Flowers in creamy-white clusters are followed by small, purple-skinned astringent fruits. The falling fruits stain whatever they touch.

**54L. YELLOW BELL** (*Allamanda neriifolia*)

Brazil  
Apocynaceae

Bush *Allamanda*, often a sprawling shrub three to five feet high, grows lower and has smaller flowers than *Allamanda cathartica*. The leaves are oblong, about four

inches long, dark green with light undersides. Flowers are golden-yellow, striped brownish-red inside, about three inches long, and distinctly swollen and greenish at the base.

**55R. BAMBOO** (*Bambusa vulgaris*) Java  
Gramineae

The Giant Bamboo are the tallest members of the Grass family, attaining one hundred to one hundred and fifty feet in height. The new culms in the center grow with phenomenal rapidity, often as much as six to ten inches a day. The large sheaths surrounding the internodes are covered with short, glossy, brown hairs. Bamboos are of great importance in the tropics where they are used for many purposes as food products and building materials.

**56L. ORANGE JESSAMINE** (*Murraya exotica*) India  
Rutaceae

Handsome, ornamental evergreen shrub, ten to twelve feet high, with glossy green foliage and sweetly fragrant, bell-shaped white flowers in clusters. Fruit, egg-shaped, vivid-red berry one-half inch long. Flowers and fruits are often seen together, making a vivid contrast. Blooms several times a year.

**57L. AFRICAN TULIP TREE**  
**FLAME OF THE FOREST** Tropical Africa  
Bignoniaceae  
(*Spathodea campanulata*)

A large, colorful tree with its fiery, orange-red flowers growing in circular groups around closed, crowded buds. It is sometimes called the "Fountain Tree" because the unopened buds will spurt compressed water when pinched. Individual flowers suggest a lopsided cup with five frilled, irregular lobes edged with vivid yellow. The tree is tall with light-gray bark and large, dark-green leaves conspicuously veined.

**58L. POMEGRANATE** (*Punica granatum*) S. Asia  
Punicaceae

An ancient, cultivated fruit three hundred years B.C. The tree has branches growing almost to the ground; foliage is fine and light. Brilliant orange-red, carnation-like flowers made up of five crinkled petals are found near the ends of the branches. The fruits are hard-rind, the size of an orange and with many seeds. Black writing ink is derived from the rind of the fruit. Punica is the old name for Carthage, the pomegranate having once been called the apple of Carthage.

**59L. PIGEON PLUM** (*Coccoloba laurifolia*) S. Fla. & Bahamas  
Polygonaceae

Evergreen tree quite different from its relative, the Sea Grape. The leaves are longer than wide, transversed by three depressed parallel veins. Greenish flowers are followed by small, pear-shaped fruits about the size of a cherry, deep purple, very juicy and quite sweet. Coccolobis is from the Greek for colored seed or fruit.

**60R. SILVER DOLLAR TREE** (*Eucalyptus cinerea*) Wales & Victoria  
Myrtaceae

A small, glaucous tree with brown-red, willowy branches bearing pairs of sessile leaves, rigid, stiff, leathery. The leaves are like a silver coin, hence the common name. Used by florists as cut branches.

- 61R. NIGHT BLOOMING JASMINE** *(Cestrum nocturnum)* West Indies  
Solanaceae
- Bushy, evergreen shrub with slender, brownish branches up to twelve feet high with a tendency to straggle; thin, leathery, ovate leaves which are light green and pointed. Flowers in axillary clusters; slender, tubular, greenish-white to cream colored. Flowers become honey-sweet after dark and are followed by clusters of pearly-white berries.
- 62L. HERALD'S TRUMPET** *(Beaumontia grandiflora)* India  
Apocynaceae
- A woody vine which becomes covered in early spring with large, Easter lily-like blossoms. The fragrant flowers, borne in heavy clusters, are five inches long, milky-white, sometimes tipped with pink and veined with green. Each flower has five lobes with ruffled edges. Dark, glossy, green leaves hang down six to nine inches; these die and drop during the blooming season. Floss from the seeds is used as a vegetable silk in India.
- 63R. KURRAJONG** *(Brachychiton populneum)* Australia  
Sterculiaceae
- No trees anywhere have so many different kinds of leaves (often on the same tree); they may be wide or narrow, entirely lobed, round or almost square. The trunk is usually thick near the ground. Bell-shaped flowers, creamy, with chocolate spots and often with a purple throat, hang in big clusters among the leaves. Used extensively as a street tree in southern Europe.
- 64R. PINK SNOWBALL** *(Dombeya wallichii)* Madagascar  
Sterculiaceae
- Popular upright tree having vigorous growth, huge velvety leaves whitish beneath, nearly twelve inches wide, and somewhat angularly heart-shaped. Many heavy, pendant balls of pale-pink flowers make it a breath-taking sight if one stands so as to look up into the tree. Each flower-head, hanging on a downy pedicel, is made up of dainty, pink florets with five petals and the stamens topped with tiny yellow stars.
- 65R. OLEANDER** *(Nerium oleander)* Mediterranean  
Apocynaceae
- One of the most important groups of tropical shrubs, since they grow with ease and produce masses of flowers in a wide range of colors, including white, cream, pale-pink, rose-pink, bright red and crimson. It is a tall shrub with gray-barked stems, slender leaves in groups of three in a dull green color, giving the plant a gray appearance. Oleanders contain a juice in all their parts which is poisonous if eaten.
- 66R. RIBBON GRASS** *(Pandanus veitchii)* Polynesia  
Pandanaceae
- Rosette of thin, recurving, variegated leaves with saw-tooth edge, dark green in the center with broad white margins. The leaves are often six feet long and about three inches or more wide. A very popular pot or house plant.
- 67R. FALSE ARALIA** *(Dizygotheca elegantissima)* New Hebrides  
Araliaceae
- Graceful shrub with no spines; compound leathery leaves are arranged finger-like with seven to eleven thread-like, narrow segments, metallic red-brown. Large

flower clusters of creamy-white are followed by a soft, black, juicy, berry-like fruit. *Dizygotheca* is from the Greek for having double the usual number of anther cells.

**68R. TROPICAL ALMOND**

**INDIAN ALMOND** (*Terminalia catappa*)

Malaya  
Combretaceae

A spreading tree widely planted in the tropics for ornament, shade, timber and the edible nuts. The leaves are large and glossy, about nine inches long, and turn exquisite shades of yellow, red and purple twice a year before the new leaves appear. Inconspicuous white flowers are followed by fibrous red fruits, almond-like, which are edible, oil-bearing kernels of excellent flavor.

**69R. GOLDEN COCONUT** (*Cocos nucifera*)

Tropical Cosmopolitan  
Palmaceae

Probably unexcelled in importance among the world's fruit trees, because it is a source of four commercial products: the sap used as a beverage; the husk fibre, called coir, used in making cord and brushes; the mature, fresh, edible nut; and the dried nut meat called copra. The tree is ornamental in its youth and in old age it is picturesque with its leaning trunk and tuft of feather-type leaves. Its origin dates back to prehistoric times.

**70R. MYRTLE** (*Myrtle myrtus*)

Mediterranean  
Myrtaceae

The true myrtle is a bushy evergreen, sometimes growing to ten feet high, with dark green leaves which have a spicy aroma when bruised or crushed. Fragrant, tiny, white flowers with numerous stamens are followed by blue-black berries. Used in condiments. Sometimes called "Bridal Myrtle" as brides in many countries wear myrtle wreaths.

**71L. BARBADOS NUT** (*Jatropha curcas*)

Tropical America  
Euphorbiaceae

Small, low-branching tree with lightly lobed, maple-like leaves and yellowish-green flowers. The fruits are yellow to red ovoid capsules, one to one and one-half inches long, having two or three compartments, each containing an oblong, black, oily seed. These are released when the capsule splits. Sometimes referred to as the Peanut Tree, Physic Nut or Purging Nut. The seeds yield a purgative oil, dangerously poisonous in quantities.

**72L. BLUE GUM EUCALYPTUS**

(*Eucalyptus hemiphloia*)

Australia  
Myrtaceae

Eucalyptus, a genus comprising many species of very aromatic, evergreen trees, generally called gum tree or stringy-bark. This variety grows to ninety feet high, has rough, persistent bark; leaves, lanceolate, thick, often grayish; flowers in panicles; fruit one-quarter inch across. The angular seed-boxes can generally be found under the trees. Hemiphloia means half-barked.

**73L. PEREGRINA** (*Jatropha hastata*)

Cuba  
Euphorbiaceae

Small shrub with oblong-obovate leaves, constricted below into fiddle-shape with tapering apex. It has showy scarlet flowers to one inch across in terminal cymes.

Peregrina is the word for exotic and hastata means spear-shaped, in allusion to the shape of the leaves. It is an ever-flowering shrub.

**74R. HEAVENLY BAMBOO** (*Nandina domestica*) China & Japan  
Berberidaceae

Beautiful evergreen shrub belonging to the Barberry family. The graceful, delicate divided leaves are tinted pink when young, then in winter change from green to red. Its reed-like stems grow to eight feet high. Seldom flowers, but when it does, the flowers are large terminal clusters of white, followed by bright red berries.

**75L. BULL-HORN ACACIA** (*Acacia sphaerocephala*) Trop. America.  
*cornigera* Leguminosae

The name indicates the type of large, inflated spines on this small tree, which may be as long as four inches. Not uncommonly, little openings are found near the top, punctured by ferocious ants living inside them. They feed on the nectar at the tip of the leaflets. The tree has numerous leaflets, yellow flowers in dense cylindrical spikes, and the fruit is a mahogany-red, thick pod at maturity.

**76L. DEADLY OCHROSIA** (*Ochrosia elliptica*) So. Pacific  
Apocynaceae

In winter and spring this neat-leaved, large shrub has conspicuous, waxy, red or deep-cerise fruits borne in pairs or clusters. They are shaped like plump almonds with a little beak at the apex and emerge from a mass of shining, dark green leaves like the heads of brilliant birds. Their fragrance is like violets when they are crushed, but they are poisonous. Ochrosia is Greek for pale yellow and applies to both flowers and wood.

**77L. DOG-PATCH PERFUME** (*Solanum abutaloides*) Trop. America  
Solanaceae

It is not difficult to tell a solanum from other plants. The flowers are wheel-shaped, having five lobes, often white, sometimes purple or yellow. The fruit is a roundish berry which is often decorative. Many species have a distinctive solanum odor. *S. abutaloides* has clusters of attractive, orange, berry-like fruits and the leaves have a disagreeable odor, which gives it the common name.

**78R. DWARF BAMBOO** (*Bambusa falcata nana*) Japan  
Gramineae

May attain eight to ten feet high, but is often less. The slender culms, scarcely thicker than a pencil, grow together in a crowded mass and are of a yellowish-brown color. Distinguished by its small, velvety leaves, emerald-green above and bluish-green below, spread out flat in regular distichus rows along the branchlets. Desirable for pot plant or in the oriental garden.

**79L. CUBAN LAUREL** (*Ficus nitida*) India & Malaya  
**CHINESE BANYAN** *F. retusa* Moraceae

Ficus is a huge genus including the common fig as well as many ornamentals like the banyan and the much-domesticated rubber plant. Var. *nitida* is a small laurel-like leaved banyan with a short, thick trunk and dense crown. It has air-roots which prop the trunk. The figs are red, purplish or blackish with three basal bracts forming a sort of cup.

- 80L. PISTACIA** (*Pistacia integerina*) Med. to Asia  
Anacardiaceae
- This tree belongs to a family which comprises a curious mixture of beneficent and objectionable plants. It includes two popular nuts, the pistachio and the cashew, also includes poison oak, sumac and poison ivy. *P. integerina* has compound leaves, small flowers without petals, and a dry, drupaceous fruit.
- 81L. SUGAR-APPLE** South America  
**SWEETSOP** (*Annona squamosa*) Annonaceae
- Deciduous fruit tree to twenty-five feet high with irregular, spreading branches. The leaves are bluish-gray, long and thin; flowers are greenish-yellow. Fruit suggests a pine cone in outline with prominent knobs, yellowish-green color, about three inches long, and much broken up by its separable divisions. The flesh is sweet, custard-like, much liked, but very perishable.
- 82L. REDHEAD POWDERPUFF** South America  
(*Calliandra haematocephala*) Leguminosae
- Spectacular small tree to thirty feet high with handsome, dark evergreen, fern-like foliage. Its nodding, four inch, red pompons, which consist of massed crimson stamens, obscure the rest of the flower. Blooming time is chiefly from December to April. The fruit is a flattened and sometimes curled pod. *Calliandra* is Greek for beautiful stamen.
- 83L. POST JELLY GUAVA** (*Hybrid variety*) Tropical America  
Myrtaceae
- Probably a hybrid of *Psidium guajava*, the common guava. The guava is primarily a jelly and preserve fruit, the high pectin and acid content of the sour varieties making possible a yield of 3½ pounds of jelly from each pound of fruit. The Post Jelly Guava produces large, red, sour fruit.
- 84L. FIDDLE LEAF FIG** (*Ficus lyrata*) West Africa  
*F. pandurata* Moraceae
- Attractive tree to forty feet high and of slow growth. The large, rounded leaves suggest a fiddle in outline and are ten to fifteen inches long with wavy edges and white-streaked veins. The fruit is as large as a plum and, when ripe, is deep crimson with white dots. This is a distinctive, dense shade tree and is valued by florists for its large, long-lasting leaves.
- 85L. KAFIR PLUM** (*Harpephyllum caffrum*) South Africa  
Anacardiaceae
- Picturesque, hardy tree with rough, gray-brown bark and open foliage. Its long, stiff, brittle branches and stubby side branches have dark-green pinnate leaves clustered near the tops of the young shoots. Grown both for the small, red, edible fruit and as an ornamental. *Caffrum* refers to Kafir, Africa.
- 86L. ALLSPICE TREE** (*Pimenta officinalis*) W. Indies & Cen. America
- Slender, upright tree, twenty to forty feet high, having dense, leathery, evergreen foliage. Its leaves aromatic, oblongish; white flowers in cymes with conspicuous stamens. The dark brown fruits provide commercial allspice, the dried berry becoming the spice. A tree yields about seventy-five pounds a year.

- 87L. FIREWHEEL TREE** (*Stenocarpus sinuatus*) Australia  
Proteaceae  
A medium-sized, slender tree with shiny, leathery leaves, resembling oak leaves. It gets its name from the bright red blossoms, shaped like a wheel, up to four inches in diameter, brilliant scarlet with yellow stamens; the inflorescence explodes like fireworks into fiery red when mature. The flower has a disagreeable odor at night, because it depends on a night-flying moth for pollination and the odor attracts the moth.
- 88L. MONKEY-PUZZLE TREE** Australia  
**BUNYA-BUNYA** (*Araucaria bidwilli*) Araucariaceae  
Evergreen tree up to one hundred and fifty feet high, pyramidal in shape. The ramifications twist and turn to form an impenetrable and very prickly growth. The needles are glossy, dark green, sharply pointed and lanceolate; fruit a heavy pineapple-like cone which may weigh ten pounds. Grown as an ornamental tree.
- 89R. MILK AND WINE LILY** (*Crinum angusta*) Asia  
Amaryllidaceae  
A bulbous, lily-like plant, growing in a rosette or clump with thick, blade-like leaves which create a perpendicular effect. From the center of the plant springs a long stem bearing a head of fragrant flowers which are white-striped or tinted rose-purple, hence the common name. *Crinum* is the Greek for lily.
- 90R. NORFOLK ISLAND PINE** (*Araucaria excelsa*) Norfolk Island  
Araucariaceae  
Symmetrical tree which may reach two hundred feet in height. Its evergreen branches radiate in regular tiers and all branchlets lie in one plane. Over-lapping, scale-like leaves of bright green are slightly curved, sharp-pointed, and about one-half inch long. It practically never fruits or flowers in cultivation. Makes an extremely popular florist's plant in its juvenile form.
- 91L. MACADAMIA NUT** (*Macadamia ternifolia*) Australia  
Proteaceae  
This tree is now grown extensively in Hawaii for the nuts, which have a hard round shell, a delicious flavor and are rich in vitamins and minerals. The handsome, dark green, holly-like leaves are used for decoration, dried or sprayed for the holidays. The fragrant, pendent flowers are cream-to-brownish in color.
- 92R. AUSTRALIAN FAN PALM** (*Livistonia australis*) Australia  
Palmaceae  
Fan palm growing to eighty feet in height, trunk slender, reddish-brown. Leaf-stalks spiny, especially on young leaves. Dense crown of dark-green, almost round, leaves. Panicles of small white flowers grow from the leaf axils. Fruit nearly round, about five-eighths inches in diameter.
- 93L. NATAL PLUM** (*Carissa grandiflora*) South Africa  
Apocynaceae  
Shrub or small tree, its branches armed with long, needle-like thorns. Leaves are leathery, bright green, simple. Very fragrant, star-like, white flowers have five waxen, pointed lobes which twist slightly to the right. Fruits are a bright, pinkish-red, about two inches long, having red pulp, suggestive of a raspberry, make excellent jelly.

- 94L. MEXICAN LIME** (*Citrus aurantifolia*) West Indies  
**KEY LIME** *C. limetta* Rutaceae

Limes are associated with the pies of the naturalized Key Lime, also substitute for lemon in tea and other drinks, and with the old remedy for scurvy which gave British sailors the nickname of "Limeys." Small, spiny tree or shrub, branches willowy, dense foliage, new growth light green; fruit light, lemon-yellow color, smooth surface, small size.

- 95L. GOVERNOR'S PLUM** (*Flacourtia indica*) Madagascar & So. Asia  
 Flacourtiaceae

Usually seen as a dense, rounded shrub to twelve feet in height. May be used as a dual purpose plant, for the fruit and as a hedge. The branches are sparsely armed with sharp axillary spines; leaves glabrous, deep-green above and slightly paler below. Small, yellowish flowers are followed by a pulpy, cherry-like, dark-maroon colored fruit, best eaten fresh. Named for Etienne de Flacourt, once a Governor of Madagascar.

- 96L. PONDEROSA LEMON** cv. (*Citrus limonia*) Maryland  
**AMERICAN WONDER-LEMON** (*Citrus hybrida*) Rutaceae

Originated about 1887 as a chance seedling. Most nearly resembles the lemon, but also suggests relation to the citron. It has been propagated as a pot plant and an ornamental variety. The tree grows eight to ten feet high with irregular branches and short, stout spines, large oblong leaves, and large, fragrant, white, waxy flowers. The large, pear-shaped fruits are of very inferior grade.

- 97L. CHINESE BOX-ORANGE** (*Severinia buxifolia*) China  
 Rutaceae

A small, spiny tree with crooked, thorny branches and dense, evergreen foliage. Leaves resemble the Box; flowers small, white, inconspicuous; fruit a pea-sized, shiny, black berry. It is esteemed by the Chinese for its leaves, which are used in making yeast cakes. Citrus can be grafted readily on *S. buxifolia*, and it has been found to be immune to many citrus diseases.

- 98R. JERUSALEM CHERRY** (*Solanum pseudo-capsicum*) Madeira  
 Solanaceae

Small, shrubby plant, having soft, deep-green leaves which are wavy at the margins and pubescent beneath. Small, white, star-like flowers are followed by large, globular, lustrous, orange-scarlet, cherry-like fruits. Since the fruit ripens among the shiny, dark leaves in December, it is sometimes called Christmas plant.

- 99L. TRIFOLIATA ORANGE** (*Poncirus trifoliata*) China  
 Rutaceae

The trifoliolate orange has been grown in China for thousands of years. Tree, rarely over twenty feet high; leaves palmate with three leaflets; flowers white, two inches wide, flattish; fruit orange-like, but scarcely over two inches in diameter, its flesh dryish, very acid, but fragrant. The Chinese have for centuries used the dried fruits in their medical practice. It is used as grafting stock for the tender citrus fruits and for ornament.

**100L. WAMPI or WAMPEE** (*Clausena lansium*) China  
Rutaceae

The Wampi or Yellow Skin is a small, fruit-bearing tree, which has spreading branches, pinnate leaves, spirally arranged, and numerous small, white flowers borne in terminal panicles. The fruits are grape-like, yellowish and rough, one inch in diameter, with white, aromatic, sub-acid pulp. Fruit usually eaten fresh, but suitable for pies, jellies and drinks.

**101L. SACRED BO TREE** (*Ficus religiosa*) India  
Moraceae

Oldest historical tree known, being brought from India in 288 B. C. This fig tree is sacred to millions of Hindus and Buddhists because it was under such a tree that Guatama meditated forty-nine days and emerged as the Buddha, or "Enlightened One." Tree has smooth, gray bark, heart-shaped leaves on long petioles, which are heavily veined in pink or ivory. Fruits are small, purplish.

**102R. RED SILK COTTON TREE** (*Bombax malabaricum*) India  
Bombacaceae

Huge, soft-wooded tree to one hundred feet high, trunk covered with corky prickles. The horizontal branches grow in whorls, and the large leaves are palmate. Brilliant, crimson flowers, four inches across, cluster near the ends of the branches when bare of leaves. The fruit, a six inch pod, splits and disgorges quantities of silky cotton, which is used as a pillow stuffing. In India, the flower buds are eaten as a pot herb.

**103R. ABYSSINIAN BANANA** (*Musa ensete*) Abyssinia  
*ventricosum* Musaceae

Huge, tree-like herb twenty to forty feet high, stem swollen at the base. Leaves, ten to twenty feet long and two to three inches wide, have reddish midrib. Flowering spike is erect, bracts reddish-brown, flowers whitish. The fruit is edible, but dry, and bears a few, large, black seeds.

**104R. INDIA RUBBER PLANT** (*Ficus elastica*) India & Malaya  
Moraceae

Large tree to one hundred feet high, but more frequently grown as a pot plant. Leaves, oblong-elliptic, six to eleven inches long, green and glossy; young leaves enclosed in rosy sheath. Small, yellowish fruit is one-half inch long. Aerial roots may become conspicuous. Yields latex-bearing, milky sap, which was formerly the chief source of rubber.

**105R. BIRD-OF-PARADISE** (*Strelitzia reginae*) South Africa  
Musaceae

Plant belonging to the Banana family, grows to three feet high with underground, woody rootstocks, but no trunk. Leaves basal to one and one-half inches long. Purplish, boat-shaped bracts enclose orange-yellow flowers with blue, arrow-shaped tongue. Bloom is like the neck of a bird topped by a lovely head with long beak and crest. Valued by florists.

**106L. GIANT BIRD-OF-PARADISE** (*Strelitzia nicolai*) South Africa  
Musaceae

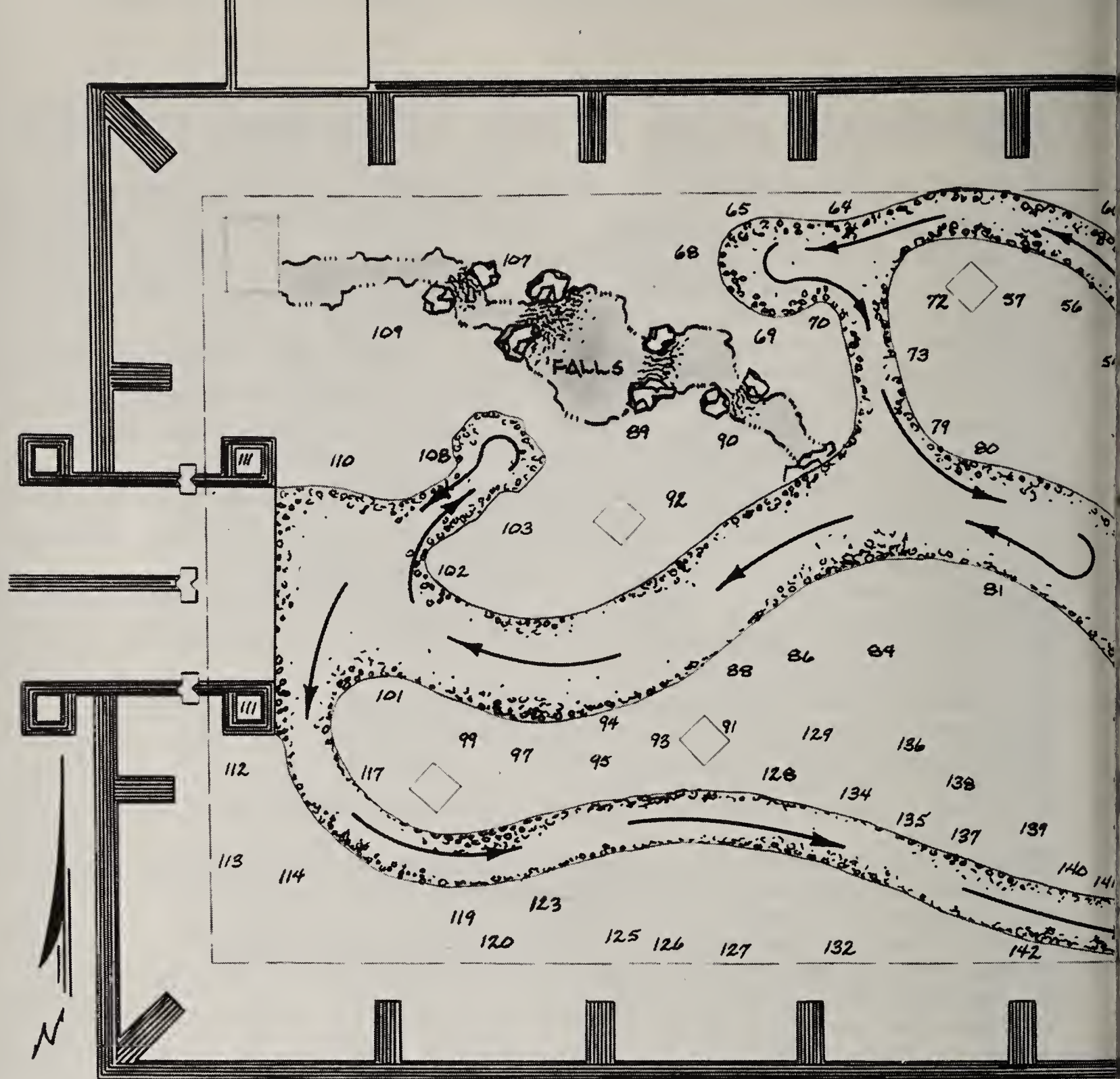
Trunk forming clustering tree fifteen to twenty-five feet high with banana-like, shiny, green, leathery leaves four feet long and two feet wide. Inflorescence with

List continued on page 88

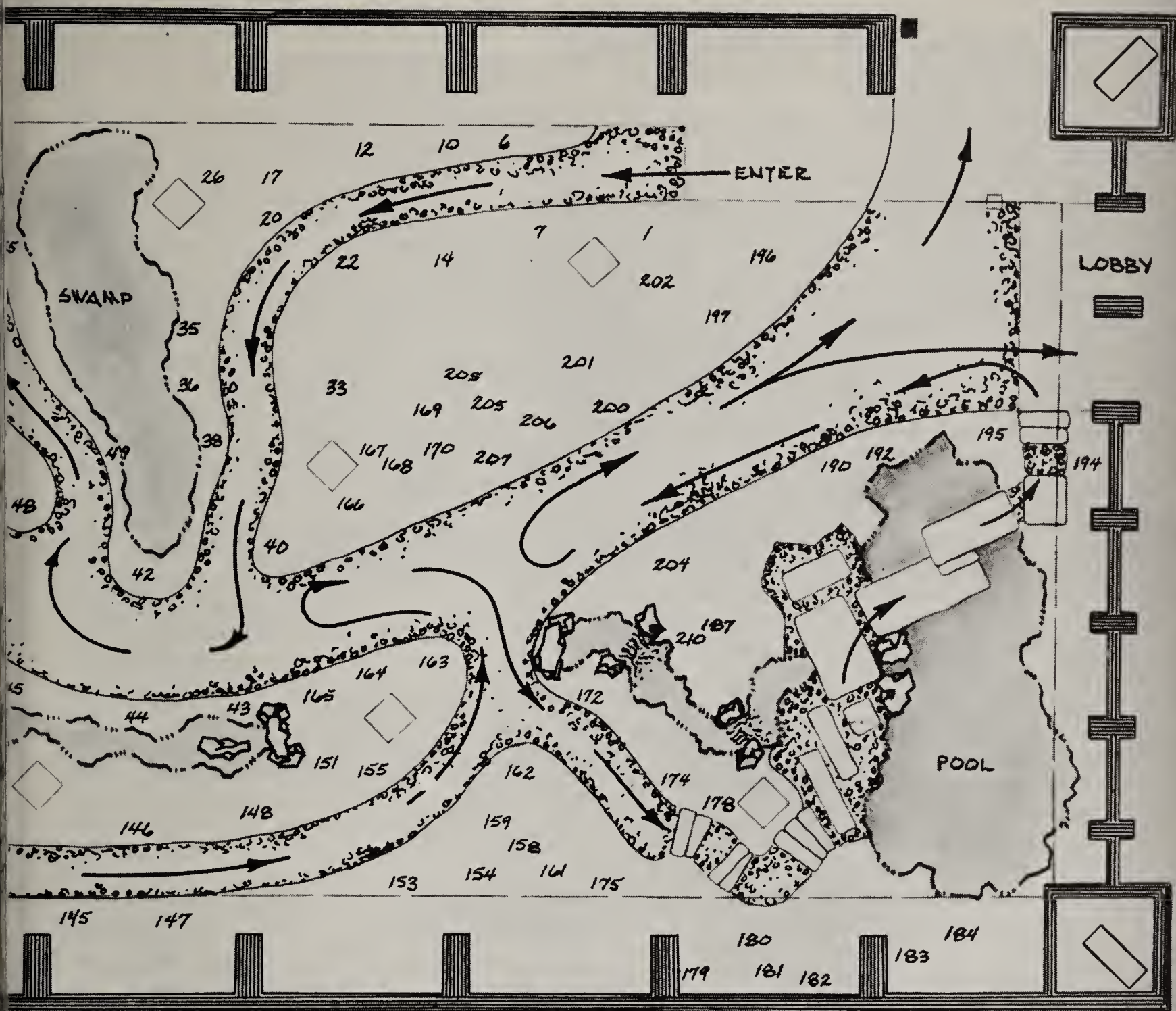
# Numerical List of Plants According to Map

(Next Page)

1. **LOQUAT** (*Eriobotrya japonica*)
2. **FALSE PALM** (*Ficus pseudopalma*)
3. **CAROB OR ST. JOHN'S BREAD** (*Ceratonia siliqua*)
4. **DOUBLE ALLAMANDA** (*Allamanda cathartica williamsi*)
5. **OLIVE** (*Olea Europaea*)
6. **JERUSALM THORN** (*Parkinsonia aculeata*)
7. **AVOCADO** (*Persea americana*)
8. **GOLD TREE** (*Tabebuia argentea*)
9. **BRAZILIAN PEPPER, CHRISTMAS BERRY** (*Schinus terebinthifolius*)
10. **BUDDHA'S BELLY BAMBOO** (*Bambusa ventricosa*)
11. **CEYLON GOOSEBERRY** (*Dovyalis hebecarpa*)
12. **CAMPHOR** (*Cinnamomum camphora*)
13. **YESTERDAY-TODAY-and-TOMORROW** (*Brunfelsia calycina*)
14. **HONDAPARA** (*Dillenia indica*)
15. **VARIEGATED AGAVE** (*Agave angustifolia marginata*)
16. **BOTTLEBRUSH** (*Callistemon viminalis*)
17. **COMMON FIG** (*Ficus carica*)
18. **YELLOW POINCIANA** (*Peltophorum inerme*)
19. **FLAME OF THE FOREST** (*Butea monosperma*) frondosa
20. **CENTURY PLANT** (*Agave potatorum*)
21. **DATE PALM** (*Phoenix dactylifera*)
22. **INDIAN EBONY PERSIMMON, CHOCOLATE PUDDING FRUIT**  
(*Diospyros ebenaster*)
23. **EVERGREEN SNOWBALL** (*Virburnum odoratissimum*)
24. **FLAME OF THE WOODS, JUNGLE GERANIUM** (*Ixora coccinea*)
25. **CHEWING GUM TREE** (*Achras zapota*)
26. **SLOTH TREE, PUMPWOOD or SNAKEWOOD** (*Cecropia palmata*)
27. **MANGO** (*Mangifera indica*)
28. **FISHTAIL PALM** (*Caryota mitis*)
29. **BANANA** (*Musa sapientum*)
30. **SNOW QUEEN HIBISCUS** (*Hibiscus matensis*)
31. **JACARANDA** (*Jacaranda acutifolia*)
32. **CHENILLE PLANT** (*Acalypha hispida*)
33. **EASTER LILY TREE** (*Chorisia insignis*)
34. **THREAD PALM** (*Washingtonia robusta*)
35. **BLOOD BANANA** (*Musa zebrina*)
36. **ANT FEEDER TREE, TRUMPET TREE** (*Cecropia peltata*)
37. **COCO-PLUM** (*Chrysobalanus icaco*)
38. **PUNK TREE, CAJEPUT** (*Melaleuca leucadendron*)
39. **GUMBO LIMBO, NAKED INDIAN** (*Bursera simaruba*)
40. **QUEEN PALM** (*Arecastrum ramonzoiffianum*)
41. **PEPPER** (*Piper unguiculatum*)
42. **LOFTY FIG** (*Ficus altissima*)
43. **ROYAL PALM** (*Roystonea regia*)
44. **HOG PLUM AMBARELLA** (*Spondias cytherea*)
45. **GLORY-BUSH, PRINCESS FLOWER** (*Tibouchina semidecandra*)
46. **DWARF BANANA** (*Musa cavendishi*)
47. **CORKSCREW CROTON** (*Codiaeum variegatum*)
48. **SCREW PINE, TOURIST'S PINEAPPLE** (*Pandanus utilis*)
49. **BAMBOO PALM, GOLDEN FEATHER PALM** (*Chrysalidocarpus lutescens*)
50. **GARDENIA** (*Gardenia taitensis*)
51. **GOLDEN TRUMPET** (*Allamanda cathartica hendersoni*)
52. **DOMBEYA** (*Dombeya elegans*)



53. JAVA PLUM (*Eugenia jambolana*)
54. YELLOW BELL (*Allamanda neriifolia*)
55. BAMBOO (*Bambusa vulgaris*)
56. ORANGE JESSAMINE (*Murraya exotica*)
57. AFRICAN TULIP TREE, FLAME OF THE FOREST (*Spathodea campanulata*)
58. POMEGRANATE (*Punica granatum*)
59. PIGEON PLUM (*Coccoloba laurifolia*)
60. SILVER DOLLAR TREE (*Eucalyptus cinerea*)
61. NIGHT BLOOMING JASMINE (*Cestrum nocturnum*)
62. HERALD'S TRUMPET (*Beaumontia grandiflora*)
63. KURRAJONG (*Brachychiton populneum*)
64. PINK SNOWBALL (*Dombeya wallichii*)
65. OLEANDER (*Nerium oleander*)
66. RIBBON GRASS (*Pandanus veitchii*)
67. FALSE ARALIA (*Dizygotheca elegantissima*)
68. TROPICAL ALMOND, INDIAN ALMOND (*Terminalia catappa*)
69. GOLDEN COCONUT (*Cocos nucifera*)
70. MYRTLE (*Myrtle myrtus*)
71. BARBADOS NUT (*Jatropha curcas*)
72. BLUE GUM EUCALYPTUS (*Eucalyptus hemiphloia*)
73. PEREGRINA (*Jatropha hastata*)



- 74. **HEAVENLY BAMBOO** (*Nandina domestica*)
- 75. **BULL-HORN ACACIA** (*Acacia sphaerocephala*) *cornigera*
- 76. **DEADLY OCHROSIA** (*Ochrosia elliptica*)
- 77. **DOG-PATCH PERFUME** (*Solanum abutiloides*)
- 78. **DWARF BAMBOO** (*Bambusa falcata nana*)
- 79. **CUBAN LAUREL — CHINESE BANYAN** (*Ficus nitida*) *F. retusa*
- 80. **PISTACIA** (*Pistacia integerina*)
- 81. **SUGAR-APPLE, SWEETSOP** (*Annona squamosa*)
- 82. **REDHEAD POWDERPUFF** (*Calliandra haematocephala*)
- 83. **POST JELLY GUAVA** (*Hybrid variety*)
- 84. **FIDDLE LEAF FIG** (*Ficus lyrata*) *F. pandurata*
- 85. **KAFIR PLUM** (*Harpephyllum caffrum*)
- 86. **ALLSPICE TREE** (*Pimenta officinalis*)
- 87. **FIREWHEEL TREE** (*Stenocarpus sinuatus*)
- 88. **MONKEY-PUZZLE TREE, BUNYA BUNYA** (*Araucaria Bidwilli*)
- 89. **MILK AND WINE LILY** (*Crinum angusta*)
- 90. **NORFOLK ISLAND PINE** (*Araucaria excelsa*)
- 91. **MACADAMIA NUT** (*Macadamia ternifolia*)
- 92. **AUSTRALIAN FAN PALM** (*Livistonia australis*)
- 93. **NATAL PLUM** (*Carissa grandiflora*)
- 94. **MEXICAN LIME, KEY LIME** (*Citrus aurantifolia*) *C. limetta*

95. GOVERNOR'S PLUM (*Flacourtia indica*)
96. PONDEROSA LEMON, AMERICAN WONDER-LEMON cv. (*Citrus limonia*)  
*citrus hybrida*
97. CHINESE BOX-ORANGE (*Severinia buxifolia*)
98. JERUSALEM CHERRY (*Solanum pseudo-capsicum*)
99. TRIFOLIATA ORANGE (*Poncirus trifoliata*)
100. WAMPI OR WAMPEE (*Clausena lansium*)
101. SACRED BO TREE (*Ficus religiosa*)
102. RED SILK COTTON TREE (*Bombax malabaricum*)
103. ABYSSINIAN BANANA (*Musa ensete*) *ventricosum*
104. INDIA RUBBER PLANT (*Ficus elastica*)
105. BIRD-OF-PARADISE (*Strelitzia reginae*)
106. GIANT BIRD-OF-PARADISE (*Strelitzia nicolai*)
107. SAW CABBAGE PALM (*Paurotis wrighti*)
108. TOBIRA, JAPANESE PITTOSPORUM (*Pittosporum tobira*)
109. ROYAL POINCIANA, FLAMBOYANT (*Delonix regia*)
110. CANARY ISLAND DATE PALM (*Phoenix canariensis*)
111. PIGMY DATE PALM (*Phoenix roebeleni*)
112. BRAZILIAN MORNING GLORY, PRINCE'S VINE (*Ipomoea horsfalliae*)
113. BRAZILIAN NIGHTSHADE, TOMATILLO (*Solanum seaforthianum*)
114. PERSIAN LIME (*Citrus aurantifolia*)
115. FIRETHORN (*Pyracantha graberi*)
116. TANGERINE (*Citrus nobilis*) *deliciosa*
117. GRAPEFRUIT TREE (*Citrus paradisi*)
118. CONFEDERATE JASMINE (*Trachelospermum grandiflorum*)
119. STRAWBERRY GUAVA (*Psidium cattleianum*)
120. RED SILK-OAK, KAHILI FLOWER (*Grevillea banksi*)
121. RED PASSION FLOWER, TACSONIA (*Passiflora vitifolia*)
122. DWARF CALAMONDIN ORANGE (*Citrus mitis*)
123. PERFUME TREE, YLANG-YLANG (*Cananga odorata*)
124. KHAT (*Catha edulis*)
125. PINEAPPLE GUAVA (*Feijoa sellowiana*)
126. CARAMBOLA OR STAR FRUIT (*Averrhoa carambola*)
127. LONGAN (*Euphoria longan*)
128. SPANISH-LIME (*Melicocca bijuga*)
129. BARBADOS CHERRY (*Malpighia glabra*)
130. HIBISCUS, ROSE OF CHINA, SHOEBLACK PLANT (*Hibiscus rosa-sinensis*)
131. BLUE POTATO BUSH (*Solanum rantonetti*)
132. COMMON OR LEMON GUAVA (*Psidium guajava*)
133. MORETON BAY PINE, HOOP PINE (*Araucaria cunninghami*)
134. TREE HIBISCUS, CUBAN BAST (*Hibiscus elatus*)
135. JABOTICABA, BRAZILIAN GRAPE TREE (*Myrciaria cauliflora*)
136. BLACK CALABASH (*Enellagma cucurbitina*)
137. SEA GRAPE (*Coccoloba uvifera*)
138. MAHOGANY (*Swietenia mahogani*)
139. ROSE APPLE, JAMBU (*Eugenia jambos*)
140. LYCHEE NUT (*Litchi chinensis*)
141. SNOWFLAKE (*Trevesia micholitzi*)
142. MADAGASCAR OLIVE (*Noronhia emarginata*)
143. RED BAUHINIA, PRIDE OF THE CAPE (*Bauhinia galpini*)
144. PODOCARPUS (*Podocarpus macrophylla* *maki*)
145. MONKEY APPLE, AUTOGRAPH TREE (*Clusia rosea*)
146. SUGAR PALM (*Arenga saccharifera*)
147. GOLDENRAIN TREE (*Koelreuteria formosana*)
148. CALABASH (*Crescentia cujete*)
149. CANDLEBUSH, ACAPULCO (*Cassia alata*)
150. SURINAM CHERRY, PITANGA (*Eugenia uniflora*)
151. FLAME BOTTLETREE (*Brachychiton acerifolium*)
152. STRAWBERRY TREE, JAM-FRUIT (*Muntingia calabura*)

153. **CHINESE TALLOW TREE** (*Sapium sebiferum*)
154. **CROTON** (*Codiaeum variegatum pictum*)
155. **SAUSAGE TREE** (*Kigelia pinnata*)
156. **CAT'S-CLAW, HUG ME TIGHT** (*Doxantha unguis-cati*)
157. **ARALIA JAPONICA** (*Fatsia japonica*)
158. **CHAULMOOGRA** (*Taraktogenus kurzi*)
159. **VARIEGATED ARALIA** (*Polyscias balfouriana*)
160. **LAUREL CHERRY, EVERGREEN CHERRY** (*Prunus caroliniana*)
161. **VARIEGATED FIG, CLOWN FIG** (*Ficus parcelli*)
162. **TRAVELER'S TREE** (*Ravenala madagascariensis*)
163. **POWDER PUFF** (*Calliandra surinamensis*)
164. **CINNAMOMUM JAPONICA** (*Cinnamomum japonica*)
165. **CORAL TREE** (*Erythrina caffra*)
166. **HONG KONG ORCHID TREE** (*Bauhinia blakeana*)
167. **RANGOON CREEPER** (*Quisqualis indica*)
168. **SILK OAK, SPIDER FLOWERS** (*Grevillea robusta*)
169. **CHRISTMAS PALM, MANILA PALM** (*Veitchia merrilli*) formerly *Adonidia*
170. **HURRICANE PALM, WHITE PRINCESS PALM** (*Dictyosperma album*)
171. **FRANGIPANI, TEMPLE TREE** (*Plumeria acutifolia*)
172. **DWARF RED POWDER PUFF** (*Calliandra emarginata*)
173. **BIRD'S NEST FERN** (*Asplenium nidus-avis*)
174. **MOUNTAIN SOURSOP** (*Annona montana*)
175. **TAPEWORM PLANT, RIBBON BUSH** (*Homalocladium platyclados*)  
*Muehlenbeckia*
176. **SHELL GINGER, PEARL GINGER** (*Alpinia nutans*)
177. **GOLD-DUST TREE, JAPANESE LAUREL** (*Aucuba japonica variegata*)
178. **QUEENSLAND UMBRELLA** (*Brassaia actinophylla*) (*Schefflera actinophylla*)
179. **CERIMAN, MEXICAN BREADFRUIT** (*Monstera deliciosa*)
180. **ELEPHANTS-EAR, TARO** (*Colocasia antiquorum*)
181. **CLIMBING FIG, CREEPING FIG** (*Ficus repens*)
182. **DUMB-CANE** (*Dieffenbachia amoena*)
183. **HELICONIA** (*Heliconia bourageana*)
184. **PINK BANANA, FLOWERING BANANA** (*Musa rosaceae*)
185. **SILVER PALM** (*Coccothrinax dussiana*)
186. **CABADA PALM** (*Chrysalidocarpus* sp.)
187. **AFRICAN MAHOGANY** (*Khaya nyasica*)
188. **HALAPEPE** (*Dracaena marginata*)
189. **ANGEL'S TRUMPET** (*Datura arborea*)
190. **STAR ANISE** (*Illicium anisatum*)
191. **SPATHIPHYLLUM** (*Spathiphyllum kochi*)
192. **SOLITAIRE PALM** (*Ptychosperma elegans*)
193. **KENTIA or FLAT PALM** (*Howea forsteriana*)
194. **CARDAMON** (*Amomum cardamon*)
195. **AUSTRALIAN BRUSH CHERRY** (*Eugenia myrtifolia*)
196. **BOUGAINVILLEA** (*Bougainvillea* sp.)
197. **GEOMETRY TREE, BLACK OLIVE** (*Bucida buceras*)
198. **RICE-PAPER TREE** (*Tetrapanax papyriferus*)
199. **STAR JASMINE** (*Jasminum ilicifolium*)
200. **PINEAPPLE MINT** (*Salvia rutilans*)
201. **SPINELESS YUCCA** (*Yucca elephantipes*)
202. **WILD COTTON, BUTTERCUP TREE** (*Cochlospermum vitifolium*)
203. **AIRPLANE PLANT** (*Chlorophytum elatum*)
204. **FIJI ISLAND FAN PALM** (*Pritchardia pacifica*)
205. **GRUMICHAMA, BRAZILIAN CHERRY** (*Eugenia dombeyi*)
206. **EAR POD TREE, ELEPHANT'S EAR** (*Enterolobium cyclocarpum*)
207. **COFFEE TREE** (*Coffea arabica*)
208. **WAY MYRTLE, BAY TREE** (*Myrica carifera*)
209. **WOMAN'S TONGUE, EAST INDIAN WALNUT** (*Albizzia lebbek*)
210. **DWARF POINCIANA** (*Poinciana gilliesi*)

boat-shaped, reddish bracts to fifteen inches long, cradling white flowers with a blue tongue. At the time the flowers open, the bracts are filled with a gummy secretion.

**107L. SAW CABBAGE PALM** (*Paurotis wrighti*) So. Fla. & Bahamas  
Palmaceae

Handsome clump palm often forty feet high when full grown. Slender trunk, bases of leaf stalks covered by red-brown matting. Leaves, green both sides; the blade, two and one-half inches long, is cut nearly half-way down into many divisions. Young plants have entire, undivided leaves.

**108R. TOBIRA, JAPANESE PITTOSPORUM** China & Japan  
(*Pittosporum tobira*) Pittosporaceae

A beautiful, dense shrub; the thick, deep-green, leathery leaves are ovate, narrowed to the short petiole. Creamy-white flowers appear in dense, terminal umbels and are very fragrant, reminding one of orange blossoms. Fruit, densely hairy, about one-half inch long. The shrub is salt-resistant and is useful for hedges.

**109R. ROYAL POINCIANA** Madagascar  
**FLAMBOYANT** (*Delonix regia*) Leguminosae

Broadheaded, deciduous tree, not over forty feet high, with grayish-brown bark. Half of trunk unbranched, then alternate branches spread and form a vast flat crown. Leaves, bi-pinnate, paler under-side. Flowers made up of five long-clawed petals, four brilliant scarlet, one yellow. Flowers so numerous that the flame-like color appears like a huge, scarlet umbrella. Fruit, a flat, long, woody pod.

**110R. CANARY ISLAND DATE PALM** Canary Islands  
(*Phoenix canariensis*) Palmaceae

A monumental and stately palm, fifty to sixty feet high, with leaves fifteen to twenty feet long. The trunk may be three feet in diameter, enlarged by leaf stalks. A hundred leaves may be borne on one tree. Leaves are rich green in color and curve attractively. Fruiting clusters often drooping, the fruit is yellowish-red, egg-shaped or roundish. Popular ornamental palm.

**111R. PIGMY DATE PALM** (*Phoenix roebeleni*) Siam  
Palmaceae

Graceful, dwarf palm which is a popular green house or tub plant. Seldom higher than six feet with slender trunk, shiny, dark-green leaves, and occasional red fruit. Introduced in 1880; however, it was very rare for many years as no seeds could be obtained from Siam because the monkeys stole the fruit.

**112R. BRAZILIAN MORNING GLORY** East Indies  
**PRINCE'S VINE** (*Ipomoea horsfalliae*) Convolvulaceae

Magenta-crimson flowers, each like a long bell with a waxy tube and five-lobed mouth, hang on this vine in great profusion in autumn, winter and spring. Leaves are a dark, rich green, usually divided into five parts, finger fashion. Vine climbs high and wide, making an excellent cover or screen and a mass of color.

**113R. BRAZILIAN NIGHTSHADE** Tropical America  
**TOMATILLO** (*Solanum seaforthianum*) Solanaceae

Slender, unarmed, slightly woody, perennial climber belonging to the potato and tomato family. Leaves, pinnate with three unequal leaflets. Flowers, numerous in drooping clusters, star-shaped, purple with prominent yellow anthers. Fruit, vivid, scarlet-red berries much relished by mocking birds and thrushes.

**114R. PERSIAN LIME** (*Citrus aurantifolia*) Tahiti  
Rutaceae

A variety of acid lime similar to the Key Lime, but more vigorous and bearing larger fruit. The tree is spreading, branches have a tendency to droop, thorns are short, foliage dense, dark green. Fruit color light, orange-yellow; surface smooth; shape, oval to elliptical; size, large. The lime is a poor keeper and shipper and is the least frost-proof of the citrus fruits.

**115R. FIRETHORN** (*Pyracantha graberi*) China  
Rosaceae

Evergreen, thorny shrub of the rose family, cultivated for its fine foliage and ornamental fruit. It is a vigorous grower with narrow, thick, leathery leaves rounded at the apex, and great clusters of large, orange-red berries from September through Christmas. The small, white flowers are borne in clusters. *Pyracantha* is from the Greek for fire and thorn, in allusion to the thorny twigs and showy fruit.

**116L. TANGERINE** (*Citrus nobilis*) *deliciosa* Cochin China  
Rutaceae

One of the oldest cultivated fruits. Medium-size tree with willow-like leaves, oval, lance-shaped, one and one-half to two and one-half inches long. The fruit, small, two to three inches in diameter, flattened at each end, smooth, loose, thin skin, reddish-orange color. The pulp is orange in color and sweet. Sometimes called kid-glove orange, because the segments are so easily separated.

**117L. GRAPEFRUIT TREE** (*Citrus paradisi*) West Indies  
Rutaceae

True origin unknown. Spreading, round-topped tree with dense foliage. The leaf petioles are very broad-winged, the blades measure four to six inches long. Large, white flowers usually borne in clusters. The smooth branches bend under the weight of the large, heavy, pale lemon-colored, round fruit. The common name refers to the grape-like clusters of the fruit.

**118R. CONFEDERATE JASMINE** South China  
Apocynaceae  
(*Trachelospermum grandiflorum*)

Not a true jasmine, but often mistaken for the Star Jasmine. It is a woody climber with oval, leathery leaves which are slightly rough or downy. Fragrant, clustered, white flowers, lobes spreading from a tube into a five-pointed star about one inch across which twists to the right.

**119R. STRAWBERRY GUAVA** (*Psidium cattleianum*) Brazil  
Myrtaceae

Plant usually seen as a bushy shrub but sometimes becoming a small tree. Often used in ornamental plantings because of its attractive, glossy, deep-green, leathery

foliage. The flowers are white with many stamens. Small, reddish-purple, berry-like fruits have a strawberry flavor and contain many small, hard seeds. Fruit is used fresh as well as being utilized for jelly making.

**120R. RED SILK-OAK** India  
**KAHILI FLOWER** (*Grevillea banksi*) Proteaceae

Ornamental tree to ten feet tall with dull, dark-green, deeply divided leaves, the under side covered with a white tomentum. Spectacular flowers are upright heads of unusual pinkish-red color, six inches across each consisting of a long, pink style tipped with a yellow stigma. They look like the crown on the tip of a jester's wand. Ovules are covered with small hairs, poisonous to some people, hence no longer made into leis.

**121R. RED PASSION FLOWER** New Spain  
**TACSONIA** (*Passiflora vitifolia*) Passifloraceae

Tendrill-climbing vine, somewhat sparse and straggling. Blossoms, colored a rich, deep red, have typical passion flower form; their unusual structure, thought by early discoverers to be emblematic of the crucifixion of Christ. The red flowers appear in clusters of two or three at a time, along the length of the stem.

**122L. DWARF CALAMONDIN ORANGE** (*Citrus mitis*) Philippines  
Rutaceae

A small, spineless tree with upright, slender branches which are dense with oval, leathery leaves on narrowly-winged petiole. Small, white flowers are borne singly at the tips of the twigs. The fruit is small, one and one-half inches around, somewhat flattened, deep orange-yellow with a strongly acid flavor. Used as a florist's or house plant in the dwarf stage.

**123R. PERFUME TREE** Philippines  
**YLANG-YLANG** (*Cananga odorata*) Annonaceae

Tall tree with gracefully drooping branches; leaves, large, oblongish with wavy margins, six to eight feet long, light green above and a little hairy beneath. A profusion of odd, greenish-yellow flowers with a pleasant fragrance; used in perfumery. The attar is more costly than the attar of roses. Ylang-Ylang means "flower-of-flowers."

**124R. KHAT** Abyssinia & So. Africa  
**ARABIAN TEA** (*Catha edulis*) Celastraceae

Evergreen tree with very bright, red fruits which persist through the winter; they are really pods, splitting at the summit to reveal red seeds. From this plant the Arabians make a beverage, the use of which possibly antedates the use of tea and coffee. The drink is made from the leaves and buds and contains an alkaloid similar to caffeine.

**125R. PINEAPPLE GUAVA** (*Feijoa sellowiana*) So. America  
Myrtaceae

A shrubby plant which does not assume a tree form but branches from the ground. The foliage and bark are grayish; the leaves are a light, shiny green on the surface and gray tomentose beneath. Striking flowers emerge in April; the white,

thick petals, which are edible, have a purplish tinge on the inner side and are in contrast to the numerous crimson stamens. The oblong-to-round, gray-green fruits have white pulp with a flavor which is a blend of strawberry and pineapple.

**126R. CARAMBOLA or STAR FRUIT**

(*Averrhoa carambola*)

Malaya  
Oxalidaceae

Symmetrical, attractive tree; light-green, compound leaves in two spiral rows which close at night and when touched. Tiny, pink flowers, not over one-quarter inch long, are clustered on old twigs or grow directly from the main trunk. Unusual, waxy, yellow fruits, three-to-five angled so that, when cut, a five-pointed star is formed. Fruit is smooth-skinned, about four inches long, nearly egg-shaped. Pulp is juicy, somewhat acid-sweet, and has the fragrance of quince when mature. Used fresh or for jellies.

**127R. LONGAN** (*Euphoria longan*)

China  
Sapindaceae

Handsome, medium-sized, evergreen tree up to thirty-five feet in height with dense, dark-green foliage and brown twigs. Leaves are compound with leathery leaflets, three to six inches long. Flowers are yellowish-white, in small terminal clusters, and more or less hairy. The fruits are globose, one inch or less in diameter, with a thin, nearly smooth, reddish-brown rind and a large seed enclosed in a gelatinous, whitish, edible pulp.

**128L. SPANISH-LIME** (*Melicocca bijuga*)

Tropical America  
Sapindaceae

Tree of large size, erect in habit of growth; shining green leaflets in two pairs (bijuga). The fragrant, greenish-white, inconspicuous flowers are borne in terminal panicles. Subglobose fruits, about one inch in diameter, with thick, green, tough skin. They contain one large, round seed tenaciously embedded in an agreeably flavored, juicy, rather acid, whitish pulp. *Melicocca* is from the Greek for honey and berry, referring to the taste of the fruit.

**129L. BARBADOS CHERRY** (*Malpighia glabra*)

West Indies  
Malpighiaceae

Spreading, densely-branched shrub, usually between six and twelve feet in height. Mature leaves are deep-green, glossy, about three inches long. The axillary five-petalled flowers range from a pale-pink to rose color. Flowering continues throughout the summer and two or three crops of fruit usually mature. Fruits are conspicuous bright-red, three-lobed, and the size of a cherry. The fruit has a high ascorbic acid content. The pulp is used in preparing ices, beverages, preserves, jams and jellies.

**130L. HIBISCUS ROSE-OF-CHINA**

**SHOEBLACK PLANT** (*Hibiscus rosa-sinensis*)

South China  
Malvaceae

Hibiscus is known as the State Flower of Hawaii. Shrub has broadly oval leaves, three to four inches long, tapering at the tips, unlobed but often toothed. Flowers are usually solitary in the upper leaf axils. Typically rose-red with flaring petals and prominent stamens. Shoeblack plant indicated the use of its flowers by tropical bootblacks to polish shoes.

- 131R. BLUE POTATO BUSH** (*Solanum rantonetti*) South America  
Solanaceae  
Plant grows in graceful, drooping form. The old branches become straggly and leafless but, if trimmed, this will become a tree with a woody trunk and crown ten feet or more across. Clusters of attractive, rich-purple flowers with yellow throats, each one inch across, suggest small, purple petunias. The flowers are sometimes followed by red berries.
- 132R. COMMON OR LEMON GUAVA** (*Psidium guajava*) Tropical America  
Myrtaceae  
In the 16th century this tree was described from Haiti and called guayabo. As a result of long cultivation of seedling plants, many forms have arisen. The common guava has a slender, crooked trunk, branching near the ground. The leaves are dull, light-green, with side veins deeply impressed. Flowers are white, fragrant, one-half to one inch in diameter. Fruit is the size and color of a lemon; flesh is pinkish, sub-acid, with many seeds. Used for jellies, jams, pies; the bark, leaves and fruit are used in native medicine.
- 133L. MORETON BAY PINE** Australia  
**HOOP PINE** (*Araucaria cunninghami*) Araucariaceae  
One of the most useful timber trees of Queensland. May attain two hundred feet in height. The slightly ascending branches are tufted and clustered and of uneven length, giving it an irregular outline. Leaves stiff, sharp-pointed, needle-like, about one and one-half inches long. Flowers and seeds are borne between the scales of an egg-shaped cone which falls apart in age. The common name is derived from horizontal banding on the trunk.
- 134L. TREE HIBISCUS** West Indies  
**CUBAN BAST** (*Hibiscus elatus*) Malvaceae  
Evergreen tree with broad, spreading form and large, glossy, cordate leaves. Blooms appear all year but mostly in winter, when masses of orange-yellow flowers appear; they change to a peculiar dark red late in the afternoon. In Cuba, the bast of the tree is largely employed for cordage and used for tying bales of tobacco, hence the name, "Cuban Bast." Wood used for furniture, interior trim, and gunstocks. Also a shade tree.
- 135L. JABOTICABA** Brazil  
**BRAZILIAN GRAPE TREE** (*Myrciaria cauliflora*) Myrtaceae  
In the tropics this tree grows to forty feet high. It branches from near the ground; foliage is tamarisk-like, leaves tapering to four inches long, upper surface dark-green, dotted, under surface paler. Fruits are borne on short stems from the trunk and main branches; black or purple when ripe, about the size of scuppernog grapes and of similar flavor. It bears three crops a year. Is used fresh and for juice or jelly.
- 136L. BLACK CALABASH** (*Enellagma cucurbitina*) Tropical America  
Bignoniaceae  
A medium-sized flowering tree, grown mainly as an ornamental and for shade.

The large, dark, glossy, green leaves make this one of the most attractive trees for coastal planting. It bears curious, gourd-shaped fruits similar to the familiar calabash shells used as maracas in Mexico. Cucurbitina means gourd.

**137L. SEA GRAPE** (*Coccoloba uvifera*) Tropical America  
Polygonaceae

Picturesque tree, twenty to forty feet high, with dense, spreading form. Unusual leaves are large, thick, rounded, glossy, marked with prominent red venation. In spring, the old leaves assume autumnal colorings and the new leaves have hues of bright copper and red. In March, racemes of small, creamy-white flowers appear, followed by bunches of green grapes along the trunk. The fruit turns purple when ripe and is used for wine and jelly. Valuable seashore tree because of resistance to salt spray.

**138L. MAHOGANY** (*Swietenia mahogani*) W. Indies & Florida  
Meliaceae

True mahogany, large evergreen tree with hard wood, turning red-brown in age. Leaves are leathery, alternate, compound, four to eight leaflets, arranged feather-fashion. Flowers inconspicuous, in whitish clusters. Fruit is five-valved, woody capsule, three to four inches long, with two-inch long, winged seeds. It is valued for its beautiful wood used in making furniture, musical instruments, ships and cabinets. Named for Gerard van Swieten, Dutch botanist.

**139L. ROSE APPLE** East Indies  
**JAMBU** (*Eugenia jambos*) Myrtaceae

Broad-headed, branching tree to thirty feet high; leaves are lance-shaped, six to eight inches long, rose-tinted when young. Flowers are fragrant, greenish-white, pompon-shaped, with numerous stamens; blooms in winter. Fruit is yellow, about two inches in diameter, egg-shaped, with sepals still clinging. Greenish-yellow flesh has rose scent and taste which persist even when made into jelly. Thought to be the tree representing the theory of creation that bore the golden fruit of immortality.

**140L. LYCHEE NUT** (*Litchi chinensis*) South China  
Sapindaceae

Medium-sized, graceful tree of open, spreading habit. Compound leaves are shiny, dark-green; inconspicuous, greenish flowers occur in loose clusters. Picturesque fruits hang in brilliant red clusters, each about one and one-half inches in diameter; flesh the texture of a muscat grape. Skin is rough and leathery, becoming thin, brittle and brown when dried, and wrinkled like a raisin. Produces two hundred pounds of fruit per tree at five years of age.

**141L. SNOWFLAKE** (*Trevesia micholitzi*) China  
Araliaceae

Small evergreen conspicuous for its large ornamental leaves which resemble a large snowflake. Variable leaves are palmately lobed, the segments irregularly pinnate, thin, leathery, glossy-green, but covered with silvery dots which add to the snowflake-like appearance, especially of the young leaves. Each leaf rests on the dilated, truncate base of the blade.

**142R. MADAGASCAR OLIVE** (*Noronhia emarginata*) Madagascar  
Oleaceae

Stiff, open-topped tree with slender branches and branchlets. The heavy, leathery, oval leaves, four to six inches long, are set at a stiff angle on the branchlets. The color is a grayish-green. Fragrant flowers are yellowish, borne in axillary clusters. The purplish fruits have a sweet, edible pulp.

**143R. RED BAUHINIA** Africa  
**PRIDE OF THE CAPE** (*Bauhinia galpini*) Leguminosae

Woody plant, almost shrublike when small, but drooping when it gets larger. Leaves are pale-green, small, deeply lobed into two equal parts. The rich, orange-red flowers have five spoon-shaped petals, each about one and one-half inches long; their form suggests a nasturtium. They appear in summer or fall, in clusters of six to ten, and are followed by pods with dark brown seeds. Insects relish the leaves, often eating them down to a lace-like skeleton.

**144R. PODOCARPUS** (*Podocarpus macrophylla maki*) Japan  
Podocarpaceae

Erect, evergreen, coniferous shrub; flexuous branches dense with waxy, dark-green, linear, needle-like leaves, spirally arranged. Male and female flowers on different plants. Fleshy, egg-shaped, greenish-purple fruit is covered with a whitish or bluish, waxy covering; fleshy stalk is purple. Podocarpus is from the Greek for foot and fruit in allusion to the prominent stalk to the fruit. Plant lends itself to shearing for a tub plant.

**145R. MONKEY APPLE** West Indies  
**AUTOGRAPH TREE** (*Clusia rosea*) Guttiferae

Tree grows twenty to forty feet high with magnificent, large, thick, ovate leaves, dark green, pointed toward stem, blunt at tip, two to four inches long. Flowers are white, delicately shaded with pink; narcissus-like in form with many waxen petals. The yellow, resinous latex of the bark and other parts is used in caulking seams of boats. Medicine is obtained from the leaves, fruits and bark. Interesting, non-edible, three-inch fruit can be dried for arrangements.

**146L. SUGAR PALM** (*Arenga saccharifera*) Malaya  
Palmaceae

Important economic palm, thirty to forty feet high, is grown chiefly for the production of sugar and palm-wine. Thick, massive trunk is ringed with decorative, long, black fibers which cover the lower parts of the leaf-stems. Erect pinnate leaves to twenty feet long are strikingly ornamental. When pierced, the young inflorescence yields a sugary sap. After the last flower-stalk has appeared, the tree dies, and the stem is found to be almost hollow. Had the tree been cut down before the flowering, the interior of the trunk would have contained a valuable starch. One tree will yield one hundred and fifty pounds of this starch, which can be made into a sort of sago.

**147R. GOLDENRAIN TREE** (*Koelreuteria formosana*) Formosa  
*deliciosa* Sapindaceae

Handsome, ornamental tree, becoming thirty feet high. Leaves are completely bipinnate. The trunk bark is dark-gray, becoming cracked and then furrowed.

Flowers in fall; small, yellow, becoming pink, in spikes above the foliage. Fruits are papery, bladder-like, quite persistent capsules, looking like red or bronze flowers on the crown of the tree; these are three-valved pods, resembling Bougainvillea bracts. Seeds are small, roundish and black.

**148L. CALABASH** (*Crescentia cujete*) Tropical America  
Bignoniaceae

Stout, stiff, spreading tree, reaching twenty feet in height. The leaves seem to jut out from the branches. It has rather unpleasant-smelling, two-inch flowers which are yellow with purple. The tree is an oddity because of its fruits which grow directly out of the main branches and trunk and are about ten inches in diameter. These are the woody calabashes from which hula dance rattles are made and the hard shells are polished and used as maracas in Mexico. In the tropics, they are used for bowls, cups and water jugs. The pulp of the fruit is poisonous and has been employed in local medicines.

**149L. CANDLEBUSH** Tropical America  
**ACAPULCO** (*Cassia alata*) Leguminosae

A shrub, rather coarse in form, with large, luxuriant leaves which are made up of many pairs of large, blunt-tipped leaflets which increase in size from base to tip. The leaves are said to have purgative properties. Upright heads of yellow flowers, almost cylindrical in form, suggest candles and give it its popular name. The pods are winged to help them scatter. In India, Hindu physicians employ this plant against all sorts of poisonous bites.

**150L. SURINAM CHERRY** Brazil  
**PITANGA** (*Eugenia uniflora*) Myrtaceae

Small, glabrous, ornamental tree, also used as a shrub or hedging plant. The numerous ovate leaves, one to two inches long, are a rich wine color when young, becoming deep-green and glossy. Creamy-white, slightly fragrant flowers, one-half inch broad, are borne in leaf axils. Fruits are size of a cherry with eight longitudinal ridges, borne singly or in small clusters, pendant on slender stems. Skin color varies from light to very dark crimson. It is eaten out of the hand or mixed with other fruits in salads; also used for jellies or sherbets.

**151L. FLAME BOTTLETREE** (*Brachychiton acerifolium*) Australia  
Sterculiaceae

Spectacular ornamental tree, forty to forty-five feet high, having a swollen trunk at the ground level to store water during dry seasons. Handsome, palmately-lobed leaves make this stiff, straight tree conspicuous. Flowers are waxy, flaming red, small, bell-like on red stalks, produced in masses near the branch tips. It is deciduous only on those branches which are about to bloom, the remainder holding the leaves. Fruit is smooth, black, about four inches long. Used as a timber tree in its native country.

**152L. STRAWBERRY TREE** Trop. America & W. Indies  
**JAM-FRUIT** (*Muntingia calabura*) Elaeocarpaceae

Small tree, to thirty feet high, with slender, somewhat drooping branches and leaves arranged in one plane. Leaves are oblique at the base, long, pointed, three

to five inches long, with edges unequally toothed, lower surfaces white or grayish from stellate hairs. Flowers are small, with white petals and numerous prominent stamens. Fruit is smooth, red or yellow, one-half inch in diameter with sweet, juicy pulp and numerous minute seeds. It is eaten fresh and also makes good tarts and jam.

**153R. CHINESE TALLOW TREE** (*Sapium sebiferum*) So. China & Japan  
Euphorbiaceae

Tree grows to thirty feet in height. Leaves are one to three inches long, slenderly long-stalked, the stalks red, arranged in five spiral rows. Trunk shows wide fissures and narrow strips of bark peeling off vertically. Flowers are staminate and pistillate, green, small, together in erect, tassel-like clusters. Fruit is globose, hard capsule made up of three compartments, each containing a white seed with a waxy covering used by the Chinese for candles and soap. The twigs, flowers and fruits all contain a milky, poisonous juice. Leaves furnish a black dye.

**154R. CROTON** (*Codiaeum variegatum pictum*) So. Sea Islands  
Euphorbiaceae

Shrubs with permanently colored leaves are one of the novelties of the tropics. Leaves are thick, leathery, glabrous, ovate to linear, entire or lobed. Color combinations are striking, involving shades of green, yellow, orange, pink, red and crimson. The color appears in splotches, dots and lines. Crotons are sun-lovers and never show their best in wet, shaded spots. The flowers are inconspicuous; the male, tiny heads of white stamens; the female developing into small, green fruits.

**155L. SAUSAGE TREE** (*Kigelia pinnata*) Africa  
Bignoniaceae

Tree grows twenty to forty feet high with compound leaves, seven to nine oblongish leaflets, having a prominent yellow center vein, greenish bark. Clusters of buds hang in chandelier-form; bell-shaped, slightly irregular, wine-colored flowers with unpleasant odor, bloom at night and fall off in the morning. Curious sausage-shaped pods, one to two feet long, dangle from the ends of long cord-like twigs. These fruits weigh from five to twelve pounds and are extremely hard and woody. The unripe fruits are used by the natives to treat syphilis and rheumatism.

**156L. CAT'S-CLAW** Argentina  
**HUG ME TIGHT** (*Doxantha unguis-cati*) Bignoniaceae

Handsome vines which cling to walls, rocks or tree trunks with three-pointed, claw-like tendrils, suggesting its common name. Leaves are semi-deciduous, compound, with paired, pointed leaflets of a delicate light green. Flowers clear, bright canary yellow, tubular, with spreading, thick, crepe-like lobes, growing in clusters of three or more, carpeting the ground with yellow when they fall. Fruit narrow, pod nearly twelve inches long. *Doxantha* is Greek for glory-flower.

**157R. ARALIA JAPONICA** (*Fatsia japonica*) Japan  
Araliaceae

Tender, evergreen Japanese shrub or small tree grown as an ornamental. Large, glossy, stiff leaves, alternate, its stalks eight to twelve inches long, the blade nearly round in outline, cut into five to nine broad-toothed lobes. Flowers small,

whitish, in small umbels, many of which are grouped in large, rather showy, branched clusters. Fruit black, berry-like, about one-quarter inch in diameter.

**158R. CHAULMOOGRA** (*Taraktogenus kurzi*) N. Burma  
Flacourtiaceae

Tall, jungle tree with straight trunk and horizontal branches; bark smooth, pale, yellowish brown. Leaves alternate, petioled, ovate, leathery, and flowers an inconspicuous pink. Fruits are velvety and contain large seeds which are the source of Chaulmoogra oil, used in the treatment of leprosy. Known for centuries to the natives of S.E. Asia as a palliative for leprosy and other skin diseases. The oil and its derivatives destroy the lepra bacilli which causes leprosy.

**159R. VARIEGATED ARALIA** (*Polyscias balfouriana*) New Caledonia  
Araliaceae

Densely branched, spreading tree to twenty-five feet high, grown for its handsome, variegated foliage. Stems grayish-green; leaves long-stalked, swollen and clasping at the base. Leaflets, generally three inches long, roundish, to four inches across, coarsely-toothed, white at the margins. Flowers inconspicuous, whitish-green in clustered umbels, rarely seen in cult. *Polyscias* is from the Greek for many and shade, in reference to the abundant foliage and shade.

**160R. LAUREL CHERRY** N. Car. to Texas  
**EVERGREEN CHERRY** (*Prunus caroliniana*) Rosaceae

Native evergreen to forty feet high; ideal street tree which, when young, has the shape of a Lombardy Poplar, but becomes more spreading when older. Glossy leaves, oblongish or narrower, almost without marginal teeth. Milky-white flowers appear in slender racemes during February and March, followed the next winter by shiny, black, cherry-like fruits, one-half inch long. Cherries are not edible and seeds contain a large amount of prussic acid. Called Cherry Laurel because the evergreen foliage suggests the true laurel.

**161R. VARIEGATED FIG** S. Pacific Is.  
**CLOWN FIG** (*Ficus parcelli*) Moraceae

Showy foliage plant with spar-like branches bearing large, oblong, slender, pointed leaves, eight inches long, slightly toothed, thin, light-green, marbled with creamy-white. The fruits turn red and contribute much to the beauty. Best of the variegated-leaved species.

**162R. TRAVELER'S TREE** (*Ravenala madagascariensis*) Madagascar  
Musaceae

A thirsty traveler can always find a drink in a Traveler's Tree. The leaves have long, thick, overlapping stems which store a quart or more of water. The plant looks like a Palm but belongs to the Banana family. Its flowers, leaves and fruits are similar to its cousin, the White Bird of Paradise. The seeds in the hard, wooden pods are edible and yield an essential oil. In Madagascar, it might be called the builder's tree: its leaves form the thatch; the leaf-stems, the partitions and sides of the houses, and the hard outside bark is laid for flooring.

- 163L. POWDER PUFF** (*Calliandra surinamensis*) Guiana  
Leguminosae  
 Small, light tree with a slender trunk and few, short, slender branches. The short lateral branchings are densely clothed with fine-cut foliage. The leaves consist of two pinnate leaves forking from a single leaf, each part carrying eight to ten pairs of narrow leaflets. This low, spreading tree is showy with numerous erect puff-like flowers consisting of protruding, silky, white stamens with pink tips.
- 164L. CINNAMOMUM JAPONICA** (*Cinnamomum japonica*) Japan  
Lauraceae  
 Economically, this family is important for the aromatic oils that are responsible for the fragrance of many of its members, including avocado, cinnamon, camphor, benzoin, sassafras, and many fragrant woods used in cabinet work. This species from Japan forms a dense, handsome, ornamental shade tree with large, strongly-nerved leaves.
- 165L. CORAL TREE** (*Erythrina caffra*) So. Africa  
Leguminosae  
 There are about sixty-five known species of *Erythrina*. These trees have small prickles, spirally arranged leaves, composed of three leaflets, and spectacular, claw-like, scarlet flowers borne in clusters, calyx two-lipped. They are pollinated by birds; the pollen collects on the birds head as it pokes into the flower to drink the watery honey at the base of the stamens. It is then rubbed off on the stigma of another flower. The bark, roots and seeds furnish the natives with medicines, insecticides and a poison which stupefies fish.
- 166L. HONG KONG ORCHID TREE** (*Bauhinia blakeana*) China  
Leguminosae  
 Most exciting and spectacular of the *Bauhinias*, this small, deciduous tree grows to twenty feet high with twisted stem. Leaves of double lobes, suggesting butterfly wings, formed by a partial split, prominent veins radiate from the point where the stem joins the blade. Showy, orchid-like flowers, five and one-half inches across; five spreading, unequal petals, carmine-rose to burgundy, with the fifth petal striped purple, prominent stamens in the center. Sterile hybrid, as it never produces seed.
- 167L. RANGOON CREEPER** (*Quisqualis indica*) Indo-Malaya  
Combretaceae  
 Quick-growing vine, without tendrils, but with vigorous climbing habits. Leaves oblong, abruptly pointed, opposite, three to five inches long. Showy flowers, borne in loose clusters, bloom all summer. The long, tubed calyx is green, the fragrant corolla white, changing to pink or red. Fruit a dry leathery, five-angled capsule about one inch long. *Quisqualis* means, literally, "who or what for" and is without known application here.
- 168L. SILK OAK  
SPIDER FLOWERS** (*Grevillea robusta*) Australia  
Proteaceae  
 Tree reaches a maximum height of one hundred and fifty feet. Many pairs of pointed leaflets in varying forms give a sparse, fern-like effect. Large, one-sided clusters of comb-like, orange-yellow flowers, with an undertone of brown, are

borne in profusion. Fruits are tiny, round, orange-yellow balls with the long pistil sticking out. Much planted as a shade and street tree and the timber is extensively utilized. The wood is like oak in grain, but the tree in no other way resembles an oak.

- 169L. CHRISTMAS PALM** (*Veitchia merrilli*) Philippine Is.  
**MANILA PALM** Formerly *Adonidia* Palmaceae

A slender, stiff tree characterized by large clusters of brilliant red fruits. Trunk is eight to ten feet in diameter and usually grows crookedly. Nine to twelve bright-green leaves, about six feet long, arch gracefully. Leaflets overlap in the center, blunt at the tips, lighter beneath than above. The bright-red berries make this palm colorful, especially at Christmas time.

- 170L. HURRICANE PALM**  
**WHITE PRINCESS PALM** (*Dictyosperma album*) Mascarene Islands  
Palmaceae

Beautiful palm with tall, slender, ringed stem, unarmed and crowned by a magnificent head of pinnate leaves, eight to twelve feet long. The petioles are covered with a white tomentum, from which it derives its specific name. The leaflets are about thirty inches long and two inches wide, bright-green on both sides and glossier on the upper than the lower side.

- 171L. FRANGIPANI** Tropical America  
**TEMPLE TREE** (*Plumeria acutifolia*) Apocynaceae

Trees are prized exclusively for their flowers which come in crowded clusters at the tips of the branches. They are long-lasting and used extensively in making leis in Hawaii. The exquisite fragrance persists even after the blossoms fall from the trees. This variety has waxy-white flowers with yellow centers. They have a milky, poisonous juice, gouty, soft-barked trunk and gray, non-tapering branches. Frangipani derived from the French word, frangipanier, meaning coagulated milk, which is descriptive of the thick, white, milky juice.

- 172L. DWARF RED POWDER PUFF** Mexico  
(*Calliandra emarginata*) Leguminosae

Clambering, small shrub with smooth bipinnate leaves, the leaflets large and oblique-ovate. The inflorescence with bright-red stamens, arranged as in a brush, suggests a small, round, soft powder puff. Calliandra is Greek for beautiful stamens and emarginata refers to a shallow notch at the apex of the leaves.

- 173L. BIRD'S NEST FERN** (*Asplenium nidus-avis*) Polynesia  
Polypodiaceae

Fern with broad, entire, bright-green fronds with dark midrib growing in a crown. The plant is an epiphyte, usually perching on limbs or in crotches of trees, hence the common name. Subsists from one rain to another on moisture retained in the "vase" made by the bases of the leaves. The plant has supposed medicinal properties.

**174L. MOUNTAIN SOURSOP** (*Annona montana*) West Indies  
Annonaceae

Small, twenty-foot evergreen with fragrant, laurel-like leaves, elliptic, five inches long. Yellow flowers are followed by unusual, kidney-shaped fruits, weighing up to six pounds, six to eight inches long, covered with short, straight, yellow prickles protruding from the skin surface. The ripe pulp is yellowish in color and the seeds are tan. The pulp has a texture like soaked cotton, is juicy and tart. Used mostly for ices and beverages.

**175R. TAPEWORM PLANT** (*Homalocladium platyclados*) Solomon Islands  
**RIBBON BUSH** *Muehlenbeckia* Polygonaceae

Odd, curiosity plant with perfectly flat, jointed, fresh-green stems, ribbon-like, about one-half inch wide, leafless at flowering time and sometimes for months. Leaves, when present, lance-shaped, about one-inch long. Flowers greenish, appearing at alternate joints. Fruit is a red or purple berry which is merely a covering for the three-angled achene. In the tropics, this plant makes a round cane to twelve feet long.

**176R. SHELL GINGER** Trop. East Asia  
**PEARL GINGER** (*Alpinia nutans*) Zingiberaceae

Rhizomatous plant forming a dense clump of arching canes up to twelve feet high, which carry luxuriant, alternate, pointed leaf blades, five inches wide and up to two feet long. Striking porcelain-like buds, white-tipped with pink, droop in clusters like a strand of closely strung shells. One flower opens at a time, has white petals with a larger, ruffled portion, yellow marked with red, vein-like lines. This yellow lip is used to make rope and paper.

**177R. GOLD-DUST TREE** Himalayas to Japan  
**JAPANESE LAUREL** (*Aucuba japonica variegata*) Cornaceae

Handsome, evergreen shrub from four to fifteen feet high, belonging to the same family as Dogwood. Opposite, glossy, leathery leaves, dark-green, blotched yellow, more or less oval, four to eight inches long and distantly toothed above the middle. Purple flowers borne at base, male and female flowers on separate plants, but both sexes must be growing in proximity for the females to produce their bright-red berries.

**178L. QUEENSLAND UMBRELLA** (*Brassaia actinophylla*) Australia  
**OCTOPUS TREE** (*Schefflera actinophylla*) Araliaceae

Evergreen tree up to forty feet high, slender, upright form with few, if any, lateral branches. Leaves large, long stemmed, made up of many radiating, dark-green, shiny leaflets, spreading out like an umbrella. Small, fleshy, dark-red flowers are crowded in small bunches along octopus-like branches. The plume-like fronds appear in the top of the tree only when in full sun and after the tree is ten years old. Grown as an ornamental tree; also attractive, hardy pot plant.

- 179R. CERIMAN** Tropical America  
**MEXICAN BREADFRUIT** (*Monstera deliciosa*) Araceae

In its native habitat, a large, woody, glabrous, epiphytic vine. Long, hanging, cord-like aerial roots grow out from the nodes. Dark-green leaves with prominent stalks are elongated, heart-shaped, twelve inches long and ten inches wide, deeply cut almost to the midrib. Bears a handsome inflorescence; the club-like flower spike rises from a creamy-white bract, sometimes twelve inches long. The sweet, juicy fruit, six to eight inches in length, looks like a long pine cone. The flavor is between that of pineapple and banana. Adventitious roots are used for making strong baskets and wattle for furniture.

- 180R. ELEPHANTS-EAR** Tropical Asia  
**TARO** (*Colocasia antiquorum*) Araceae

Herbaceous plant with arrowhead-shaped leaves and flowers which are of the jack-in-the-pulpit or calla form. Since ancient times, taro has been cultivated for food in the tropics of the old and new world. The large, starchy root stalks are used like potatoes and in Hawaii are cooked and pounded into poi. Young leaves, eaten as greens, are called lu'au. The sprouts, gathered in the spring, are known as dasheen and used like asparagus.

- 181R. CLIMBING FIG** China & Japan  
**CREEPING FIG** (*Ficus repens*) Moraceae

Vigorous climber which forms an effective decoration on a wall. The small, light-green leaves are thin and grow flat. Masses of small, wiry branches adhere tightly by their fine rootlets. A peculiar change takes place when the plant outgrows its support. The new upright shoots are stiff and woody with leaves which are larger, heart-shaped, dark-green and leathery. Fruits are hollow, greenish-white, the shape of a small pear. The milky sap is said to form good rubber.

- 182R. DUMB-CANE** (*Dieffenbachia amoena*) Tropical America  
Araceae

Forms a free-standing specimen with large, lance-shaped leaves, varying from six to ten inches wide and fourteen to twenty inches long, branching alternately from a thick stem. The medium-green leaves have irregular yellow and cream markings along the lateral veins. Its highly acrid juice is irritating to mucous membranes and can make speech almost impossible for some days. An old legend says it was given to slaves as a punishment. Named for J. F. Dieffenbach, a German botanist. One of the most popular house plants.

- 183R. HELICONIA** (*Heliconia bourageana*) South America  
Musaceae

Large, banana-like herbs, comprising over forty species. Leaves from ten to fifteen feet high are transversely ribbed. The leafstalks all rise from the ground, differing from the banana, and without a true stem. Leaves topped by showy, erect inflorescence, the most striking part being the boat-shaped bracts from between which the flowers are borne. Fruit, a bluish capsule, separates into berry-like segments. Name derived from Mt. Helicon in Greece, seat of the muses.

- 184R. PINK BANANA** India  
**FLOWERING BANANA** (*Musa rosaceae*) Musaceae

A small plant of the Banana family with a slender trunk, seldom more than five feet high, with leaves which are quite small in proportion. In summer, an upright flower stalk holds conspicuous, bright, rosy-lavender bracts, each encasing small, yellow, tubular flowers. The tiny fruits which follow are inedible. Grown as an ornamental plant.

- 185R. SILVER PALM** (*Coccothrinax dussiana*) Barbados  
Palmaceae

Beautiful, stately fan palm with tall, slender trunk, bearing a crown of palmate leaves. Satiny, silver coloring on lower sides of the leaves characterizes this palm. Leaves are about two feet in diameter, somewhat umbrella-shaped, split easily in the wind. Trunk has the appearance of being wrapped in burlap. The yellow flower clusters are followed by blackish fruits.

- 186L. CABADO PALM** (*Chrysalidocarpus sp.*) Cuba  
Palmaceae

Quite a rare, handsome palm from Cuba with graceful leaves and smooth trunk. Related to "Areca" or Yellow Bamboo Palm, but more upright and less wide-spreading. Stems blue-green instead of yellow. It produces many small, red seeds in long clusters.

- 187L. AFRICAN MAHOGANY** (*Khaya nyasica*) Africa  
Meliaceae

In Africa, tree grows to one hundred and fifty feet high with enormous crown. Trunk bark streaked with light-colored blotches. Large opposite leaves, mostly near twig-apex with leaflets in five or six pairs. Upper surface of leaves red at first, becoming dark-green and glossy, under surface lighter-colored. Flowers are white and the fruits are woody capsules, nearly spherical, with flat, winged seeds. Timber is red, hard and easily worked for furniture. Seeds, crushed and boiled, yield oil.

- 188L. HALAPEPE** (*Dracaena marginata*) Madagascar  
Liliaceae

Tall, slender, picturesque plant belonging to the Lily family. Trunk, mottled with leaf scars from old leaves, may reach twelve feet in height. Its whorls of narrow, sword-like leaves are shiny, olive-green, edged in red, rigidly spreading horizontally. Flowers, which are rare in greenhouses, are yellowish and fragrant. Grown as an ornamental. When small, it makes an interesting pot plant; as it grows taller, it creates a sparse, attractive design against a wall.

- 189L. ANGEL'S TRUMPET** (*Datura arborea*) Peru  
Solanaceae

Tall bush almost covered with immense, pearly-white, hanging trumpets up to ten inches long. They open at night and have an intense, musky scent. The flowers have five thin segments, each coming to a twisted point. Large leaves are grayish-green, thick and velvety, occurring in pairs, one a third shorter than the other, with inch-long stalks. Cultivated as an ornamental, even though the leaves and seeds are poisonous.

- 190L. STAR ANISE** (*Illicium anisatum*) Japan  
Magnoliaceae  
Small Japanese aromatic tree or shrub related to the Magnolia. Leaves are short-stalked, elliptic, without marginal teeth. Flowers one inch wide, yellowish-green with many narrow petals. Foliage has spicy smell of sassafras. Fruit is borne in star-shaped clusters. In Japan, the powdered bark is mixed with resin and used as incense in the temples. The anise of commerce comes mostly from an herb. *Illicium* is Latin for something enticing, in allusion to the pleasing aroma.
- 191L. SPATHIPHYLLUM** (*Spathiphyllum kochi*) Tropical America  
Araceae  
Ornamental plant which forms a clump of graceful, dark, glossy-green leaves, each narrow, pointed, wavy and with prominent venation. The inflorescence rises up between the leaves on thin stems. The very delicate flower bract is white, waxy and thin, while the spike is quite rough and also waxy-white. The plant can be used as a ground cover in shady, moist places. *Spathiphyllum* is from the Greek for leaf and spathe refers to the leaf-like spathe.
- 192L. SOLITAIRE PALM** (*Ptychosperma elegans*) Australia  
Palmaceae  
Small, stately feather palm with a solitary trunk not over twenty feet high, having distinct rings or leaf scars. The few, large, pinnate fronds, which arch from short stems, are bright-green. From the base of the sheath, appear bushy, white, fragrant flowers which are followed by small, red fruits in open clusters.
- 193R. KENTIA or FLAT PALM** (*Howea forsteriana*) Lord Howe's Is.  
Palmaceae  
Palm having a stout trunk which may attain a height of sixty feet. Leaves are seven to ten feet long, erect, straight and flat. The many segments, about one inch wide, stand out horizontally from the main leafstalk and will ultimately turn downward. Often seen growing in tubs indoors.
- 194R. CARDAMON** (*Amomum cardamon*) East Indies  
Zingiberaceae  
An attractive, ginger-like plant with thick, leathery, lanceolate leaves that give off a spicy odor when crushed. Forms a large clump from six to eight feet in height. Flowers are yellow and borne in bracts.
- 195L. AUSTRALIAN BRUSH CHERRY** Australia  
Myrtifolia  
(*Eugenia myrtifolia*)  
Small, vigorous shrub with slender branches, dense, with small, elliptic leaves. The red-tinted young growth gives a lovely effect; later leaves are glossy-green. Fluffy white flowers, one-half inch in diameter, are used in making jelly. Popular shrub for topiary work.
- 196R. BOUGAINVILLEA** (*Bougainvillea sp.*) Brazil  
Nyctaginaceae  
Woody vine belonging to the Four O'Clock family. The stems are thorny and bear small, bright-green, triangular leaves with wavy margins. Inflorescence, three-parted, with small, yellowish-white, tubular flowers, surrounded by paper-like bracts, varying in color from crimson to purple. The bracts are erroneously regarded as the flowers. Named for Louis A. de Bougainville, a French navigator.

**197R. GEOMETRY TREE** Tropical America  
**BLACK OLIVE** (*Bucida buceras*) Combretaceae

Tall, broad-spreading tree, forty to fifty feet high, with trunk which becomes thick and scaly. One of the common names is derived from the way the spiny branches grow at right angles to the trunk and fork in one plane. Leaves alternate, normally oblong, but sometimes almost diamond-shaped, leathery, and crowded at the ends of branches. Armed with oxhorn spines up to one inch long. Inconspicuous flowers are greenish-white, followed by small, brown, ovoid fruit. The wood, which is hard and tough, is used for fences, piling, bridge timbers and charcoal.

**198L. RICE-PAPER TREE** (*Tetrapanax papyriferus*) Formosa  
Araliaceae

Plant, sometimes a small tree, which supplies the celebrated Japanese and Chinese rice paper. Grows twelve to fourteen feet high. Large, much-lobed leaves, deep-green above and silvery beneath, are extremely ornamental. The young leaves are covered with a white felt. Large, loose bunches of greenish-white blossoms attract buzzing insects. Rice paper is made from the pith of the plant. It is pared into thin rolls and flattened into sheets.

**199R. STAR JASMINE** (*Jasminum ilicifolium*) West Africa  
Oleaceae

Climbing or clambering evergreen which is a frequent and heavy bloomer. The haunting perfume has been praised in the songs of many poets. Leaves trifoliate (leaflets in threes), thick, glossy, oblong, pointed. The fragrant petals are white, star-shaped, one inch wide, narrow and dainty.

**200R. PINEAPPLE MINT** (*Salvia rutilans*) Europe  
Labiatae

Salvia includes a number of herbs and shrubs grown for their flowers and aromatic leaves, some species used for seasoning. Characterized by their square, pubescent stems, the leaves of this variety have a distinct pineapple scent. Scarlet-red flowers appear on tall spikes. Salvia is from the Latin "to be healthy," in reference to the medicinal properties of some species.

**201R. SPINELESS YUCCA** (*Yucca elephantipes*) Mexico  
Liliaceae

Round-headed "Palm-lily," with the trunk springing from a swollen base. Branches above, with age, reaching forty-five feet, topped by rosettes of glossy, grass-green leaves with rough margins and soft apex. Leaves similar to "Spanish Bayonet" except for the tip. Showy flowers are ivory-white.

**202R. WILD COTTON** W. Indies  
**BUTTERCUP TREE** (*Cochlospermum vitifolium*) Cochlospermaceae

Large tree, forty feet high, with thick, awkward branches spreading into an almost flat crown. The leaf has five, deeply-cut lobes with serrated edges. Flowers grow in large clusters. The individual flower resembles a buttercup, deep-yellow, mahogany-brown sepals and numerous orange stamens incurved into a ball in the center. Fruit is a three to five-valved capsule, containing numerous small seeds

covered with long, white floss, used by the natives for stuffing pillows and mattresses. Bark contains a fiber used for cordage. Jaundice remedy made from wood and leaves.

**203L. AIRPLANE PLANT** (*Chlorophytum elatum*) South Africa  
Liliaceae

Plant four to eight inches high with swollen, tuberous roots. Leaves long, flat, ribbon-like, often one inch wide and four to eight inches long. Foliage is green in the typical form, but white-margined or strikingly banded with yellow in some species. Flowering stems are two to three feet long, inclined to sprawl. Small, white flowers. Near the top of long stems, appear adventitious plantlets, suggesting the common name, used for propagation.

**204L. FIJI ISLAND FAN PALM** (*Eupritchardia pacifica*) Fiji & Samoa  
Palmaceae

One of the most beautiful palms of the Pacific region. Slender, clean trunk, thirty feet high. Numerous, short-stalked fan fronds form a large crown. The leaves, four feet wide, are bright, olive-green and deeply pleated. Young leaves are covered with brownish-white fuzz. Yellowish-brown, fragrant flower, in three-foot spadex, appears among the foliage, followed by one-half inch lustrous, blue-black fruit.

**205R. GRUMICHAMA** Brazil  
**BRAZILIAN CHERRY** (*Eugenia dombeyi*) Myrtaceae

Decorative, upright, pyramidal tree. Evergreen, small in size and compact in habit. Leaves leathery, oval to obovate-oblong, four to five inches in length and two to two and one-half inches in breadth. Fruit is pendent on long, slender stems, globose, scarlet or purplish-black in color, with four large, persistent sepals at the apex; thin, delicate skin and flesh which is soft, melting and sweet, with an agreeable flavor. Taste more like northern cherries than other tropical fruits called cherry.

**206R. EAR POD TREE** Venezuela  
**ELEPHANT'S EAR** (*Enterolobium cyclocarpum*) Leguminosae

Interesting tree which draws attention by its enormous spreading crown and thick trunk. The large crown is supported by buttresses which run some distance from the base of the trunk. Leaves are fern-like and the fluffy white flowers with protruding stamens are borne in long-stalked globose clusters. Numerous, curiously ear-shaped, black seedpods are evident on the smooth, gray branches. The "Elephant" part of the common name refers to the gigantic gray trunk with circular scars which add to the resemblance to an elephant's leg. Trunks used as boats and water troughs; bark used for tannin, soap and medicine.

**207R. COFFEE TREE** (*Coffea arabica*) Africa & Asia  
Rubiaceae

Small, regular shaped tree with lateral branches in horizontal pairs, light-colored bark, glossy, evergreen, opposite leaves. The fragrant, pure white, star-shaped flowers burst forth in clusters of one to four. Equally attractive are the brilliant red berries, one-half inch in diameter. Coffee beans, growing in pairs inside the

berry, take six and one-half to seven months to mature. When ripe, the pulp is removed, beans dried, shelled, graded and stored to season, then roasted and ground.

**208R. WAX MYRTLE**

**BAY TREE** (*Myrica cerifera*)

Florida  
Myricaceae

A native evergreen provided with dense branches and foliage to the ground. The color of the foliage is distinct having a brown tint in the green. The small, serrated foliage exhales a pleasant, spicy odor. In winter, the female trees are covered with masses of small, black berries or nutlets, appearing white on account of their silvery bloom. These nutlets are surrounded by a thin, powdery, wax-like substance which was formerly used in the manufacture of church candles because of its fine, incense-like scent.

**209R. WOMAN'S TONGUE**

**EAST INDIAN WALNUT** (*Albizzia lebbek*)

Asia & Australia  
Leguminosae

Tall, deciduous tree, upright form, graceful, feathery foliage, leaves being compound. Flowers are in clusters; greenish-yellow, tassel-like blossoms borne in the axils and followed by strap-shaped, dry pods, light tan, six to twelve inches long. Pods are so numerous that they look like dried leaves and rattle incessantly, thus the common name. Grown as a shade tree. Named after Albizzi, an Italian naturalist.

**210L. DWARF POINCIANA** (*Poinciana gilliesi*)

Tropical Cosmopolitan  
Leguminosae

Shrub or small tree which may grow to twenty feet high. Leaves are delicately feather-like, light-green with rounded leaflets. The tree grows widely through the tropics of both Asia and America, so its original home is uncertain. Bright clusters of yellow flowers grow on the higher branches and suggest the blossoms of the royal poinciana. Individual flowers have five thin, spreading, yellow petals, conspicuous, long, red stamens and a pistil which projects from the center. Flat seed pods follow the flowers.

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*The Editorial Committee wishes to express sincere appreciation to Mrs. Phil Hayward for the many hours of painstaking research she spent in checking the common and botanical names and descriptions of the plants listed in this issue. Mrs. Hayward is a member of the Associates of Denver Botanic Gardens, an organization of volunteers.*

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Reservations for guided tours of the Conservatory at Denver Botanic Gardens may be made by calling the Conservatory number, 297-2348, between 9:00 a.m. and 4:00 p.m. daily.



Mr. Lawrence A. Long, President of Denver Botanic Gardens Board of Trustees, and Mr. Cris Dobbins, President of the Boettcher Foundation Board, exchange congratulations upon completion of the Boettcher Conservatory.

## The Boettcher FOUNDATION

H.M.V.

### DONORS:

MR. and MRS. C. K. BOETTCHER  
 CHARLES BOETTCHER  
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“PURPOSES AND ACTIVITIES: To ‘assist, encourage and promote the general well-being of mankind within the territorial limits of the present State of Colorado.’ Grants chiefly for higher education, with emphasis on scholarships and fellowships, for hospitals, community funds, research in medicine, cultural activities, and welfare programs. No loans or grants to individuals. Expenditures from capital permitted.”

This brief statement merely outlines the skeleton of the structure that is the Boettcher Foundation. However, there are many silent, yet eloquent, testimonials to the cultural, educational and humanitarian achievements of this philanthropic organization. It might seem that most eloquent of all would be the articulate voices of those young men and women who were enabled to pro-

ceed with higher education through scholarship funds provided by the Foundation. These scholarships are awarded, not on a basis of need, but on a merit basis. Surely, however, there must have been many students who qualified in both areas from among the 459 who have been chosen for scholarships since the Program’s inception in 1952. How many of these scholars, who might have otherwise accepted a mediocre career, were launched into rewarding, often lucrative vocations, because of the financial assistance provided them? Many of these young men and women have graduated with the highest honors and are contributing to society in fields ranging from mathematics to religion, including such modern-day pursuits as Aerospace Engineering and Computer Programming (Boettcher Scholar graduates).

Every year has produced a galaxy of stars in the Undergraduate Scholarship Program. In 1965 alone, from a total of 37 students, 23 graduated from 5

colleges and universities in Colorado with special honors: Summa Cum Laude, Magna Cum Laude, Cum Laude, With High Distinction, With Distinction, With Special Honors, With Honors. Surely this is a most impressive testimonial to the success of the Boettcher Undergraduate Scholarship Program!

Each year the Boettcher Foundation makes awards to the outstanding graduates of the Boettcher School for Crippled Children. These awards are made for the purpose of furthering the student's education or providing apprenticeship if desired. They have proved their value in assisting these young people to adjust to the responsibilities that confront them.

The Boettcher School for Crippled Children exists because of a desire expressed by the Denver School Board to establish a school for crippled and handicapped children in 1938. 40% of the estimated cost would come from Federal Funds providing that the remaining 60% could be raised locally. A proposed bond issue for this amount failed of passage and, rather than have the community lose this needed facility, the Boettcher Foundation provided the remaining 60%. In 1956, the Foundation provided the finances for an addition which doubled the capacity of this school. The school was named the Charles Boettcher School for Crippled Children in honor of Mr. Claude Boettcher's father and in recognition of his great interest in handicapped children.

The construction of a building or buildings for science, engineering and research at the University of Denver was an interest of Mr. C. K. Boettcher during his lifetime. The Trustees of the Foundation studied the furtherance of this interest and, consequently, on February 18, 1963, the first three units

of the Boettcher Center for Science, Engineering and Research were dedicated at the University of Denver. In his acceptance speech of the original grant, University of Denver Chancellor Chester M. Alter said: "In seeking integration of the sciences, their use in the fields of engineering and the application of both in the vast areas of research, the Boettcher Foundation has made it possible for the University to embark on a pioneering educational enterprise affecting these vital and swift moving areas."

The Boettcher Health Center at Colorado College was completed and dedicated in November, 1964. This center is designed, not to replace the services of large general hospitals which are close by in Colorado Springs, but to treat minor illnesses at the same time permitting the patient to continue his studies as much as he is able and to return him as soon as possible to regular college routine. The planning of this center takes into account the special problems associated with a college health center such as the possible prevalence of respiratory diseases, athletic injuries and emotional disturbances. The circular design of the building has a number of advantages and represents a unique solution to the problems of such a health center. It is located centrally on the campus to be near classrooms, residence buildings, food service facilities and sports areas. A major grant from the Boettcher Foundation along with grants from the Kresge and Fleischmann Foundations made the construction of this prototype building possible.

The recently completed Edna C. and Claude K. Boettcher Memorial Conservatory, located in Denver Botanic Gardens York Street Unit, was dedicated on January 16, 1966. This beautiful and unique structure is further

evidence of the Foundation's interest in promoting the educational and cultural facilities of the State of Colorado. In addition to the Conservatory, there are two large working greenhouses, the gift of an anonymous donor. A third building, to be known as Horticulture Hall, will complete this complex of buildings at Denver Botanic Gardens.

These are the silent testimonials which, every day, are providing the people of Colorado with means for advances in research, education and cultural improvements in their daily lives.

The calibre of the members of the Board of Trustees of the Boettcher Foundation has always been of the highest quality. Men and women of great discernment have served to establish and maintain the high standards required for the wise investment and dispersement of the trust funds. The present trustees and officers are listed here:

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The material in the foregoing article is excerpted from *The Boettcher SCHOLAR*, the yearly report of the Boettcher Foundation Scholarship Program.

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The Denver Botanic Gardens Conservatory is open to the public, free of charge, every day Saturday through Thursday from 9:00 a.m. to 5:00 p.m. and on Friday from 9:00 a.m. to 9:00 p.m. The Conservatory telephone number is 297-2348. Please call there for any information about the new building.

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***Request for Membership Application***  
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.....  
*Horticulture*

HALL

By MARILYN HOLMES  
.....

IN ADDITION to the Conservatory and Greenhouses, the master building plans for Denver Botanic Gardens include Horticulture Hall. It will be built to the south and east of the Conservatory with a main lobby connecting the two buildings. Plans call for concrete construction with red Colorado sandstone trim, and a roof design similar to that of the Conservatory. This important new structure will house the Helen K. Fowler Library and the Kathryn M. Kalmbach Herbarium and will provide space for an auditorium, classrooms and laboratories.

The auditorium, with a stage at one end and a hydraulically operated platform beneath the apex of the glazed dome, is designed to accommodate large flower shows and sizeable meetings of horticultural and botanical groups. A projector-room on the mezzanine will serve the auditorium.

The Helen K. Fowler Library, which is now crowded into one small room at Botanic Gardens House, will have a capacity of 10,500 books—particularly strong in horticultural material. A lower level of the new library facilities will permit expansion to include another 37,500 volumes.

The Kathryn M. Kalmbach Herbarium, to be located on the mezzanine, will be a depository for approximately

4,000 dried, mounted plant specimens and will allow space for the collection to expand. The Herbarium should be of great value to students of Botany, for it will allow increased display space, which is at present at a minimum in Botanic Gardens House.

The lower level of Horticulture Hall will have a main lecture room and three smaller rooms to be used for classes, meetings and laboratories. These will have direct access to the out-of-doors, making them particularly useful to the Children's Garden Program. Horticulture Hall will provide laboratory space for certain kinds of research work when sufficient money is available for a good research staff.

This is but the beginning of a long-range program in the development of botanical and horticultural research in this region, but the completion of Horticulture Hall will mark the end of the first phase: the three-building complex consisting of the Conservatory, the Greenhouses and Horticulture Hall.

More than a third of the \$600,000 needed to build Horticulture Hall has already been raised or pledged for future payment. The fund-raising committee is still hard at work to make Horticulture Hall — this last important phase of the Denver Botanic Gardens presently planned building program — a reality in the near future.

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# *The Green Thumb*

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Botanic Gardens House

## DENVER BOTANIC GARDENS

DENVER, COLORADO

*This is a non-profit organization supported by municipal and private funds.*

A botanic garden is a collection of growing plants, the primary purpose of which is the advancement and diffusion of botanical knowledge. This purpose may be accomplished in a number of different ways with the particular placing of emphasis on different departments of biological science.

The scientific and educational work of a botanical garden center around the one important and essential problem of maintaining a collection of living plants, both native and exotic, with the end purpose of acquisition and dissemination of botanical knowledge.

# *The Green Thumb*

JULY-AUGUST 1966



THE COVER Japanese Lantern, Denver Botanic Gardens, York Street Unit

*THE GREEN THUMB*

VOLUME TWENTY-THREE, NUMBER FOUR

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# *The Green Thumb*

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By becoming a member of Denver Botanic Gardens, you will receive *THE GREEN THUMB* and the monthly *NEWSLETTER*. You will also have unlimited access to the use of the books in the Helen K. Fowler Library at Botanic Gardens House.

For further information write to the Membership Chairman, Mrs. William Stanley, 3800 East Long Road, Littleton, Colorado 80120 or call 771-3617.

# TRAVELS OF "THE BOY AND A FROG"



The Boy and a Frog by Elsie Ward Hering  
Designed and executed in Paris in 1898, this  
statue is now in the herb garden of the Denver  
Botanic Gardens in the town in which Elsie Ward  
Hering grew up.

LOUISA WARD ARPS

AFTER 68 years of travel from Paris to Philadelphia to St. Louis and several times across the United States from New York to Denver, the statue of "The Boy and a Frog" has come home to rest in the herb garden at Denver Botanic Gardens.

Elsie Ward, who grew up in Denver, designed and executed this statue when she studied in Paris in 1898. There it was exhibited at the Society of American Artists, and later, by special request, at the Philadelphia Academy of Fine Arts.<sup>1</sup> In Denver in 1903, at the opening of the Art Gallery of the Den-

ver Public Library, "The Boy and a Frog" drew favorable attention. Henry Read, president of the Art Commission, and other artists made an effort to purchase for the city "this figure of a noble shock-headed youth crouched on the edge of a rock. He has a bull-rush in his hand with which he is tickling a frog."<sup>2</sup>

The next year "The Boy" traveled to the St. Louis World's Fair where he won a bronze medal for the sculptor, then went to New York where Miss Ward had a studio. He came to Denver again in 1920 in a traveling art

exhibit. After the death of Elsie Ward in January 1923, her family stored the plaster cast of "The Boy and a Frog." Now the author, Miss Ward's niece, is pleased to present a cement cast of the statue to the Denver Botanic Gardens.

Elsie Ward was born in Missouri, where, she remarked years later in an interview, she received the "vital" spark while making images from clay found in the famous clay bed on her father's farm in Howard County. <sup>1</sup>She added that her five brothers and one sister could all make things from clay and she probably added to herself that her sister had helped send her to art schools, and her younger brothers had given her appreciation for the beauty of a child's figure.

From Missouri the Ward family moved to Denver. After graduating from North Denver High School in 1889, Elsie began modeling in private classes. In the first seven catalogs of the annual exhibit of the Denver Artists Club, 1894 to 1900, Elsie Ward's name appears as a contributor with an increasing variety of sculptured pieces, such as relief portraits. <sup>2</sup>One of these was of her mother, Alice Talbot Ward, and one of Margaret Gray Evans (wife of Governor John Evans of Denver). According to the April 15, 1900 *Denver Times*, "Miss Elsie Ward has done especially for the Seventh Exhibit 'The Manila Soldier' for which a handsome young volunteer posed for her in his uniform."

For two years, 1896 and 1897, she studied in New York at the Art Students' League. The *Daily News* for December 24, 1897, listed among Colorado's bright art students in New York, Miss Anne Evans, Miss Elizabeth Spalding, and Miss Elsie Ward. The last, the article stated, was making a brilliant record in sculpture under

Augustus Saint-Gaudens. Her first year she won honors over men students with the first prize for "Youth."

The following year Miss Ward spent in Paris; then, after a sojourn in Denver, with a studio in the Kittredge Building, she returned to the east. Saint-Gaudens, considered by many art critics the foremost American sculptor of the 19th Century, asked her to come to Cornish, New Hampshire, to his art colony, to be one of his assistants. She broke her nine-year stay there with work at her New York studio and at various exhibitions. In 1902 in Charleston, South Carolina, she worked by invitation in the studio of the director of sculpture for the Charleston Exposition. There she received a silver medal for a fountain, "Mother and Child," and also her first important commission for the "Huegenot Group," a father, mother, and two small children. <sup>1</sup> (The French Protestants, Huegenots, were important pioneers in Charleston, having established a congregation there as early as 1680.)

In Charleston, a visitor described her thus: "Any day in the week Miss Ward may be found busily at work, her exquisite clay model of her 'group' beside her. The enthusiasm of the young sculptress, though most quietly manifested, is clearly evident, and the eye of the visitor, while strongly attracted by the work, is to be more fascinated by the sculptress herself in her pink chambray working gown, buttoned in the back in school girl fashion, her vivid face aglow with pleasure and interest in her work."<sup>1</sup>

In 1904 at the St. Louis World's Fair, she not only won a bronze medal for "The Boy and a Frog"<sup>4</sup> but a \$3000 prize for a drinking fountain and a commission to make a portrait statue of a noted frontiersman. She chose George Rogers Clark, young



**Elsie Ward Hering**

In her pink chambray gown at work on the Seated Lincoln, one of the statues she completed for the famous American sculptor, Augustus Saint-Gaudens. This large statue, now in Grant Park, Chicago, dwarfs Miss Ward who was not quite five feet tall.

military genius of the Old Northwest, and modeled him with fringed breeches and long rifle.<sup>5</sup>

Recognition, of sorts, in her own home town came on February 7, 1906, when she was awarded \$100 for a design for the Civil War Soldiers' Memorial to be placed in front of the State Capitol Building in Denver.<sup>5</sup> It had taken the state legislature forty years to decide to erect a Civil War

Memorial, but even after the design was selected in competition, the legislature failed to vote the \$15,000 necessary for the bronze casting. Elsie Ward's design was of a Winged Victory. The local G.A.R. thought poorly of the symbolic lady, but accepted a gift from John D. Howland, Denver artist, for the figure of a Union Soldier which was installed on the Capitol grounds in 1909.<sup>6</sup>

In New Hampshire, Elsie Ward worked with Saint-Gaudens during the last years of his life. His son wrote that his assistants were even more vital to his father's happiness than his friends and family. At the time of Saint-Gaudens' death, August 3, 1907, the assistants "whom he held in close affection" included Henry Hering and Elsie Ward.<sup>7</sup> Most of the big works from Saint-Gaudens' studio, planned by him in his last years, went through Elsie Ward's hands. These small, disciplined hands fashioned feathers so that even in marble they look soft. To attain this perfection, the artist spent hours studying wild goose feathers sent her from Colorado by her brother Tom. The feathers on the Winged Victory who leads the horse General Sherman rides at 59th Street off 5th Avenue, New York, show her light touch. (This is the statue which caused a Southern observer to remark, "Just like a Yankee to let the lady walk!")

One statue is signed by both Augustus Saint-Gaudens and Elsie Ward. It is the Baker Memorial in Kensico Cemetery, Valhalla, New York — the figure of a seated Christ in bronze with a background of praying angels in bas-relief, of which Saint-Gaudens' son wrote, "Of the angels that were to go behind the figure, Saint-Gaudens left only the roughest sketch... The sketch and modeling of this relief was en-

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The Child Angel Baptismal Font  
by Elsie Ward Hering.

trusted to one of my father's most gifted assistants who, under his direction, had finished much of his sculpture and who had worked for him upon the Christ. She, with infinite care and patience . . . produced an astonishingly beautiful and poetic result."<sup>7</sup>

In 1910 Elsie Ward and her co-worker, Henry Hering, came to her home in Denver and were married in All Saints Church. Back in New York she continued her own work, but also helped her husband with his commissions. The caryatids that support the entablatures on either side of the entrance to the Chicago Museum of Natural History (Field Museum) show the heroic conception of Henry Hering and the gentleness of his wife.

In 1917 Mrs. Hering saw a dream materialize in marble. Twenty years before, in Paris, she had conceived the

idea of a baptismal font, a child angel holding a large shell. In 1917 this font was commissioned for the chapel at Oaks Home, Denver<sup>8</sup> and now stands in the church in which Elsie Ward was confirmed and married — All Saints, now called the Chapel of Our Merciful Saviour, at 32nd Avenue and Wyandot Street, Denver.

After her death in 1923, this statue was again reproduced in marble. Henry Bacon, architect of the Lincoln Memorial in Washington, D.C., designed

a setting for it, and he and Henry Hering placed it as a memorial in St. George's Episcopal Church in New York City. Her husband wrote of her, "She never relaxed, even to the end of her last illness, her determination to put into form her dreams of beauty and design. No one can look upon the figure of the Child Angel Baptismal Font . . . without realizing that the world has lost a great artist in her untimely death."<sup>9</sup> Elsie Ward Hering, 1871-1923.

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- <sup>9</sup> Memorial statement for Elsie Ward Hering by Henry Hering.

Credit is extended to Anne Byrd Kennon of Denver for much of the research work which was necessary to authenticate some of the material in Mrs. Arps' article.



## M. Walter Pesman

The late M. Walter Pesman, author of *Meet the Natives* and *Meet Flora Mexicana*, had not exhausted all of his knowledge with the publication of these two books. His fertile mind still abounded with interesting ideas that he had hoped to express in another book, which hope, unfortunately, never came to fruition.

However, the manuscript for the proposed book has been generously given by Mrs. Pesman to Mrs. Kath-

arine Crisp, a long-time friend and confrere of the late Mr. Pesman. It is the intention of the Editorial Committee to run a series of articles in *The Green Thumb* magazine, using excerpts from this manuscript, which the committee thinks will be of great interest to our readers.

The first article appears in this issue of the magazine entitled: Above Timberline — Where Flowers Commune With The Clouds. — Editor.



ABOVE TIMBERLINE . . .

## Where Flowers Commune With The Clouds

M. WALTER PESMAN

*"You are sure to be lost in wonder and praise, and every hair of your head will stand up and hum and sing like a congregation."* Thus, John Muir describes a mountain top experience in an electric storm.

Perhaps it is not fair to start a description of alpine heights with such an electric experience, fascinating as it is. After all, it may not happen to you once in a dozen visits; and other emotions are sure to impress you as just as exciting — although, perhaps, in a different way.

For instance, did you ever see a mountain top "floating in the air?" It may well happen on a semi-cloudy forenoon. You walk along in either sunshine or shade. Above you hangs a cloud, hiding the mountain ranges ahead. Your attention is on nearby things: the path ahead, the mystery of the forests, some interesting rock for-

mations close at hand. Then your vista chances to widen. You look farther ahead, wondering when the clouds will lift.

Then it happens: the miracle. Apparently poised in mid-air, unbelievably high above you, the floating snow-mountain bathed in brilliant sunlight, without visible contact with the earth. Majesty! Glory! Mount Rainer in Washington loves to show itself in this unexpected manner, the Spanish Peaks in southern Colorado may display this wonder in technicolor, Pikes Peak is at its best when thus etherealized. It is an unforgettable experience.

Close-up communion with high

mountains is just as inspiring. Timberline acts like a stage curtain, a separation between the earthbound and the unreal. Above timberline we are in a different world. No wonder people used to identify "heaven" with the sky and no wonder the Greeks chose high Olympus as the abode of their many gods.

There is a god-like quality to these heights, a quality that effects even gross mankind and makes it strive to be more god-like. The "unbelievable" alpine meadow is an intrinsic part of this supernal atmosphere. Here we have the macrocosmos of extensive mountain ranges combining with the microcosmos of plant life. Here are pygmy shrubs hundreds of years old. Dr. E. T. Wherry, of the University of Pennsylvania, claims that it is not unusual for Whitlowwort, *Paronychia pulvinata*, a cushion-like, shrubby plant with inconspicuous greenish flowers and moss-like foliage to attain two hundred years



DWARF FORGET-ME-NOT  
*Eritrichium argenteum*

of age while remaining only a few inches tall. Microscopic examination of the annual rings would prove such a statement. Whitlowwort covers much of the ground surface, causing the dark green background cover in the summer and changing it to rich brown in the fall.

Amateur botanists and other nature lovers are more apt to be attracted by the colorful carpet of dwarf forget-me-not, pink moss campion, fairy primrose, the fragrant white rock jasmine and alpine phlox (the jasmine with an orange eye — the phlox has a bluish cast). No one, who has ever smelled the rich fragrance of rock jasmine, *Androsace carinata*, as it actually "rolls" over the mountain meadow, could ever repeat the unfounded tale of Rocky Mountain flowers being scentless.

Besides the flowers mentioned, we are apt to find the following growing in full sun: goodsized alpine gold-flower, *Rydbergia grandiflora*, aptly called sun-god, with woolly, large "sun-flower heads" in an erect position on short, woolly stems; quantities of alpine sandwort, *Arenaria sajanensis* and *A. aequicaulis*, five-petaled, non-fragrant, with moss-like foliage; yellow alpine avens, *Sieversia turbinata*, the most abundant flower near timberline with numerous five-petaled flowers and deeply divided dark green leaves; delicate alpine lilies, *Lloydia serotina*, with purple-veined, six-petaled flowers and grass-like leaves; two dwarf clovers, *Trifolium dasyphyllum*, with regular clover heads of purple-spotted, yellow florets and *T. nanum* with only two or three dark lavender flowers, closely nestled among the clover leaves.

Alpine springbeauty, *Claytonia megarrhiza*, is a plant that will immediately draw attention to itself: a rosette of dark green, fleshy leaves surrounded by a wreath of delicate white flowers with pink veins; it occurs on high mountain tops but does not bloom until July or August, when some of the aforementioned flowers have already gone to seed. It is rather difficult, for instance, to find the springbeauty at the same time as dwarf forget-me-not and fairy primrose.

To find the greatest number of alpine flowers, it becomes necessary to do a great deal of wandering about. On these windy heights, even a little rock may afford protection to the less hardy plants. A north slope may be better for the mountain dryad, *Dryas octopetala*, a choice ground cover shrub with scalloped leaves and neat, cream-colored flowers (you can discern how many petals it has by noticing the botanical name). Mountain avens, mentioned above, does not necessarily want a north slope, but it may find there the moderately moist soil which it craves. Skypilot, the beautiful purple-blue (but smelly) flower with orange anthers, *Polemonium viscosum*, and *P. confertum*, are not cushion plants, either, but like the protection of a stony niche.

The author of a clever magazine article referred to the low-growing mid-get plants as "belly plants," explaining that the only way to study them is to "belly-flop" amongst them and examine them in detail. That author had reference to tiny desert plants; many of our alpiners are truly "belly-plants."

Incidentally, such an undignified position is rewarding in many ways. It will reveal a great many things. Try it. You may suddenly come across a well-hidden bird's nest (the brown-capped Leucosticte or rosy finch nests from 12,000 feet to the highest mountain tops.) Then again, being inconspicuous and silent, you may be surprised to discover some white-tailed ptarmigans, perhaps a mother and chicks. Or a curious cony or pika may be inquisitive about you, squeaking at you and darting about the barren rock piles, busily harvesting his hay crop. He looks like a comfortably fat, rather inconspicuous, quite industrious guinea pig.

Ptarmigans are among those unrealistic dictionary animals such as aard-



ALPINE SPRINGBEAUTY  
*Claytonia megarrhiza*

vark, newts, gnus and chameleons. We take it for granted that they do exist, but innately feel "there ain't no such animal." Here, on high mountain tops, white-tailed ptarmigans are at home, but scarcely visible — they are so well-camouflaged among the brown rocks. Their very leisurely behavior makes them all the more inconspicuous. As the seasons change, so do the ptarmigans; by the time snow covers the ground, our ptarmigan has become a snow-white bird — practically invisible again.

While you are prone on the ground, you are also sure to see some of the alpine insect life: a few gaudy butterflies, bees and ants, busy and not particularly fearful. You see, they have had no opportunity to find out how nasty a human being can be toward other creatures.

Another surprise awaits you a little farther down the mountain where snowbanks are filling protected small gulches. At the very edge of such a snowbank, curious little blackish holes appear. On close examination we find them to be the "breathing holes" of a delicate poppy-like snow buttercup, *Ranunculus adoneus*, which pushes its way up through the snow, a most thrill-affording sight.



# NASTURTIUMS

DR. HELEN MARSH ZEINER

**N**ASTURTIUMS, favorite flowers in grandmother's garden, have proved their worth over the years and are still popular garden flowers today. They are one of the easiest-to-grow of all annuals and, for a reasonable amount of care, will give a rich reward in colorful bloom.

Our garden nasturtiums have been developed from wild species found growing in tropical and South America, particularly from the cooler parts of Chili and Peru. Nasturtiums belong to the family *Tropaeolaceae*, which includes the single genus *Tropaeolum*. Roughly 50 native species of nasturtiums range from southern Mexico to Chili.

*Tropaeolum majus* and *Tropaeolum minus* have been the most important ancestral species for our garden nasturtiums. Plant breeders have practiced selection and hybridization to produce nasturtiums ranging in color from palest yellow, through orange, to deepest red. We can choose single- or double-flowered varieties. Some nasturtiums have a vining habit of growth, making them useful in special locations.

The name *Tropaeolum* comes from the Greek word for "trophy." The leaves are shield-shaped. The botanist would describe them as orbicular (circular) and peltate, with the petiole attached at the center of the lower surface rather than at the margin as is the usual case.

The flowers are helmet-shaped. This is best seen in single-flowered varieties. Pick off a flower and turn it upside down, and you will see the resemblance to a miniature helmet.

Nasturtiums are excellent for cutting, and will bloom better for it. It is also advisable to remove old blossoms to encourage prolonged bloom.

While we think of nasturtiums chiefly as flowers to add a splash of bright color to the garden and to provide us with an endless supply of cut flowers, grandmother made other uses of her nasturtiums.

The young seed pods were gathered and pickled, either by themselves or as an addition to mixed pickles. They

were considered a delicacy and nasturtiums were often grown for the pods rather than for the flowers. Pickled nasturtium pods are delicious, and one wonders why this use has slipped into obsolescence.

The stems and leaves of nasturtiums contain a pungent sap which gives them a peppery taste. Tender young leaves were used in salads, giving much the same effect as water cress. In England this use gave rise to the common name "Indian Cress."

Because of these old-fashioned culinary uses, nasturtiums deserve a place in the herb garden. Because of their showy flowers and easy culture, they deserve a place in any sunny border where yellows and reds can be used.



## *Editorial Steering Committee*

KATHARINE V. CRISP  
*Chairman, Editorial Committee*

The Editorial Steering Committee was established on December 15, 1965 to make decisions concerning the kinds of publications to be issued under the auspices of Denver Botanic Gardens, Inc., and to set limits on the number of such publications.

In addition, it is the responsibility of this committee to set up the working budgets for all publications (with the approval of the Finance Committee and the Board of Trustees.)

This committee has the responsibility

of settling any controversial issues that may arise.

At present, *The Green Thumb* and *The Green Thumb Newsletter* are the responsibility of the Editorial Steering Committee.

Therefore, individuals and organizations contemplating issuance of published material under the auspices of Denver Botanic Gardens should present preliminary material to the Editorial Steering Committee for approval.

# Dr. Louis B. Martin

## Appointed as Director

H.M.V.



**D**ENVER BOTANIC GARDENS announces the appointment of Dr. Louis B. Martin as Director, effective in August 1966. In order to accept this appointment, Dr. Martin is retiring as Chief of the Education Division, Los Angeles County Department of Arboreta and Botanic Gardens, Arcadia, California.

It is our pleasure to welcome Dr. Martin who has established a very fine background of achievements during his scientific career, which seems to have assumed positive direction in 1942 with his first course in botany during a summer session at the University of

Wisconsin. He then pursued the study of botany at Northern Illinois State Teacher's College and went on to receive his B.A. in Botany in 1948 at the University of California, where he majored in Life Science and chose Earth Science as his minor. In 1954 he received his Ph.D. in Botanical Science at the University of California.

As a young man, Dr. Martin was employed as assistant to the Head Gardener at the Morton Arboretum in Lisle, Illinois. In 1942 his career was interrupted, as were so many others at that time, by the advent of World War II. He served in the Armed

Forces until 1946 in the Medical Corps, Army Specialized Training School in Engineering and the Signal Corps as Radio Operator. His active service was performed in the Pacific Theatre.

Following his honorable discharge, Dr. Martin was appointed Research Assistant at the California Arboretum Foundation, Inc., Arcadia, on a project concerning soil conditioning for the Monsanto Chemical Co. from 1951 to 1953. From 1953 until July 1961, he acted as Plant Physiologist for the Los Angeles County Department of Arboreta and Botanic Gardens where his major activities centered about turf-grass variety plots for management and the testing of slow burning plants for fire prevention, control and reforestation. In July 1961 until the present time he has held the post of Chief of the Education Division at the same institution. His Education Divisions were: Adult Education, Children Education, Gardener School, Information, Library, Historical and Staff Artist. From October 1964 to April 1965, on leave from Los Angeles County, he served as temporary Assistant Director at the University of Michigan Botanical Gardens, Ann Arbor, Michigan.

As an editor, Dr. Martin piloted *Lasca Leaves*, quarterly publication of the California Arboretum Foundation, Inc., for seven years and for four years was responsible for the Annual Report of the Los Angeles County Department of Arboreta and Botanic Gardens. He has also written many

scientific articles and collaborated with others in the preparation of such material. He has had numerous newspaper articles published on educational and timely plant topics in the Pasadena Star News and the Arcadia Tribune. In this same educational field he has participated in innumerable radio programs which were presented as public service features for the Los Angeles County Department of Arboreta and Botanic Gardens. These varied in length from three minutes to one-half hour.

He is, at present, Chairman of the Education Committee, American Horticultural Society, and is a member of the American Association of Botanic Gardens and Arboreta and the International Horticultural Society.

How he has found time to pursue hobbies is an interesting question but he manages to indulge a liking for camping and fishing (we hope that Colorado lives up to its reputation), reading and tinkering about with radio.

This is but a brief summary of the activities Dr. Martin has engaged in during his career as scientist and educator but it should give our readers an idea of the scope of his interests.

Dr. Martin and his wife, Betty, together with their daughter, Louise, and son, Lindsay, will be welcomed as newcomers to the Denver area in late August. We look forward to helping them become orientated and to assisting Dr. Martin to assume the responsibilities of his new post as Director of Denver Botanic Gardens.



Reservations for guided tours of the Conservatory at Denver Botanic Gardens may be made by calling the Conservatory number, 297-2348, between 9:00 a.m. and 4:00 p.m. daily.





# *The Herb Garden*

VIRGINIA L. STANLEY

*Denver Botanic Gardens Guild*

**T**HE HERB GARDEN at Denver Botanic Gardens York Street Unit was formally dedicated on July 19, 1966. It is located just east of the road leading to the Gaylord Street gate. It measures 81 feet by 65 feet and is divided into a working garden at the east end and a formal garden to the west.

The garden site was purchased in 1961 by the young women who belong to an organization which was known, at that time, as the Denver Botanic

Gardens Junior Committee. In May 1963 the group changed the name to the Denver Botanic Gardens Guild. (It was pointed out that the members would not be "Juniors" forever!).

The Herb Garden was designed by Mrs. Persis McMurtrie Owen of Cherry Hills. Mrs. Owen submitted three different traditional plans. Of these three, the final design was selected and approved in April, 1963. The brick paths of the formal garden were completed in 1965; they are laid in five interlock-

ing circles to form a traditional bow-knot design.

The herb plants used in stocking the garden were purchased from Mrs. Donald Spencer with money raised from the sale of gardening calendars which were prepared by Guild members. The beds in the formal garden were planted with Teucrium (germander) and Artemisia (sage), and during this summer annual herb plantings have been added. The charming appearance of the garden is enhanced by a statue, "The Boy and a Frog,"\* which is placed on a circular base within the planting area, forming the center of the dominant circle. This statue was given to Denver Botanic Gardens for the Herb Garden by Louisa Ward Arps in memory of her aunt, the late Elsie Ward Hering, the sculptress.

A low bayberry hedge forms the east, west and north borders of the garden, and the south side is bordered by a low wall. In the working end of the garden are grown most of the herbs which are sold at the herb booth during the Denver Botanic Gardens an-

nual plant sale; in 1965 the Guild sold 3,089 plants, the proceeds being designated for the benefit of the Gardens.

The herbs are also used to make various flavored vinegars of which 144 bottles were sold in 1965. The members of the Guild prepare, bottle and take orders for the vinegar and they have found, to their delight, that the demand for this product is growing.

The Herb Garden is also maintained by the Guild members and one may see these young women (and their offspring) watering, planting and weeding throughout the spring and summer months.

Thanks to the imagination and devoted efforts of the Guild members and the skill of Mrs. Owen, this project has been a great success. Denver Botanic Gardens has an additional point of interest for visitors in this lovely Herb Garden. You are urged to come and see it.

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\*The history of "The Boy and a Frog" as well as of the career of its designer, Elsie Ward Hering, will be found in another article in this issue by Louisa Ward Arps. — Ed.

## Clyde E. Learned

We are certain that all of the friends of the late Clyde E. Learned will want to join us in a thoughtful farewell to that fine gentleman, who died early this year.

The tributes have all been made to him. The void he left will never be filled. We are happy, though, that we were able to honor him while he was still alive, with the special issue of *The Green Thumb* magazine, The Rose issue, which dealt with rose culture in the Denver area. The material was compiled by Mr. Learned through many years of working with his favorite (and only) flower and will be of value to rose-growers for many years to come. What nicer memorial could a man have than the knowledge that he had completed something which would be of lasting benefit to those who are interested in promoting beauty in the community through growing fine roses?

Appreciation is expressed to the many friends who contributed to the memorial fund for Mr. Learned. It is still growing, so no decision has been made as yet on what form this memorial will take.

# The First Book on Garden Design

WALTER D. POPHAM

*Landscape Architect*

FROM TIME IMMEMORIAL, gardens have been pictured on the walls of temples and palaces, sculptured in bas-relief on stone cliffs and on the walls of buildings; representations of the gardens of Paradise were cast on the bronze doors of basilicas and even presented in symbolic representations of trees and plants. Garden scenes were painted on scrolls, on manuscripts and in every sort of picture. Historians and archaeologists have given us restorations and descriptions of the Hanging Gardens of Babylon, Hadrian's Villa, the sacred stones and forests of Japan and the "Paradises" of the ancient near-East, while our Christian Bible has inspired many, many attempts to picture the Garden of Eden.

Similarly, early scientists gave us books on the elements of botany, of horticulture and agriculture and ancient herbals describing plants and their uses.

However, few accounts have ever been written which were more than descriptions of the vanished gardens of the past, (many of them suspect today), and I know of but one book which actually tells how an early garden was created and explains clearly both the mental processes and the techniques by which a garden comes into being.

This book is the *Sakutei-kei*, *The Memorandum of Garden Making*, sometimes alternately translated as *The Way of Gardening*, a Japanese book. Both the date and the author are uncertain, but most Japanese authorities agree that it must have been written in the late years of the Heian period in Japan,

which ended in 1155 A.D., and some authors are bold enough to give it a date of approximately 1040. The earliest book with which I am familiar, written in Western languages, on the design of gardens is an account by Piero Crescenti, an Italian. In the last years of the thirteenth century, he wrote a book on the design of ancient Greek and Roman gardens, using information drawn mostly from the knowledge of ancient writers. Thus, the Japanese book antedates this by, roughly, 250 years.

The author is identified as Toshitsune Tachibana by Dr. Y. Yoshinaga in his scholarly book, *Japanese Traditional Gardens*, and by Dr. Tadashi Kubo, Professor of Landscape Architecture at Osaka Prefectural University; Lorraine Kuck, in her excellent book, *The Art of Japanese Gardens*, states that the author "was probably Fujiwara No Toshitsune, a member of the famous Fujiwara family which practically ruled Japan from the tenth to the twelfth centuries by the 'oblique' method of marrying Fujiwara daughters to the princes of Imperial blood, many of whom later became emperors." At any rate, the author was a member of the Heian court aristocracy, probably not a practicing gardener. The Heian court noble "was able to cap a Chinese poem or write an appropriate one on any subject; paint pictures, design a costume for the many and elaborate court ceremonies; plan a house or build a garden; concoct perfumes and incense; and all of these

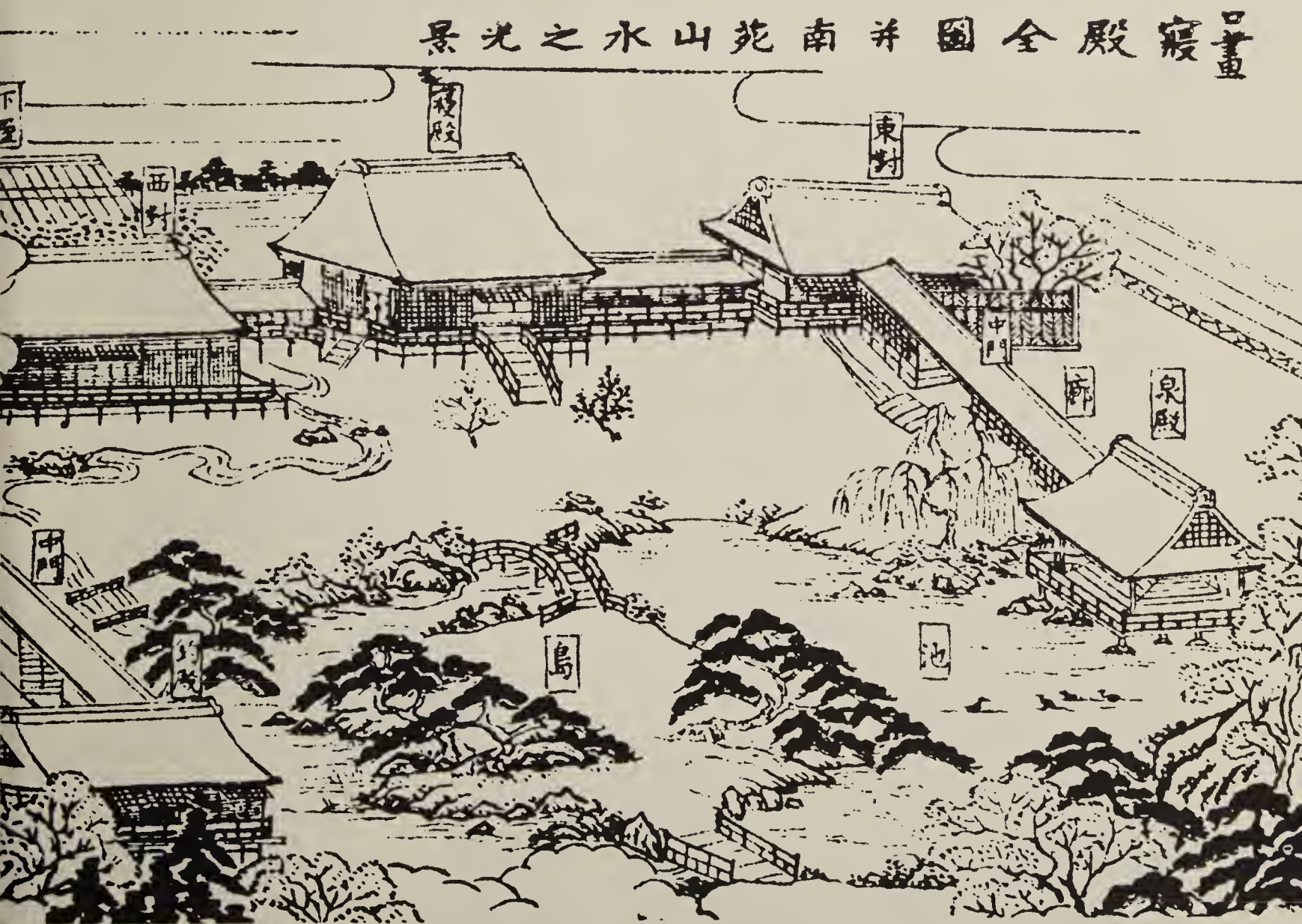
things he did effortlessly and well.” According to Sir George Sansom, in his scholarly work, *Japan, A Short Cultural History*, “Certainly what occupied the thoughts of these courtiers were ceremonies, costumes, elegant pastimes like verse-making or even love-making according to rules.”<sup>1</sup>

All Japanese garden historians agree on the age and authenticity and the significance of the work. Dr. Tsuyoshi, “Father of the Japanese National Park Service” and later its Director, says: “This is certainly one of the oldest books in the world so comprehensively treating of garden art.” Dr. Yoshinobo Yoshinaga, of the School of Horticul-

ture of Tokyo University, cites the book as having had a wide influence in the development of gardens in Japan and calls it the “bible” of garden designers. Dr. Osam Mori, of the Cultural Properties Institute in Nara, says: “The true ideals of the philosophy of Japanese gardeners are best seen in the book *Sakutei-kei*, published in the tenth century through the eleventh century and in the scanty remains of gardens of the period.”

However, in evaluating the book, one must remember that it was written over 900 years ago and, naturally, describes only the gardens of that time and before. It is, therefore, valueless for a study of the later gardens of the Zen or Ashikaga types.

<sup>1</sup> Sir George Sansom, *Japan — A Short Cultural History*



This is the typical Shinden-zukuri garden — of the period when *Sakutei-kei* was written. The discerning eye can pick out the shinden and its dependencies, the lake, island and bridges, the roofed corridors, the fishing pavilion and the Yare Mizu.

The garden of this time was the so-called *shinden-zukuri* or "Palace and Pond Garden" or "Palace and Island Garden." Most of these were built by the Fujiwara aristocracy in the Heian Capitol of Kyoto, although in the late



Marsh-mode

Heian period, some gardens were built in the suburbs of Kyoto and even in the far northern part of the main island at Hiraizumi, where a northern branch of the Fujiwara family was established and continued to build in the current Fujiwara style as in Kyoto.

The *Shinden-zukuri* style was an architectural type of garden, well described in "Art, Life and Nature in Japan," by Dr. Masharu Anesaki: "The mansion of a noble of this time was built simply of wood and bamboo. The floor was raised several feet above the ground and was reached by staircases. The gently sloping roof was covered with shingles thickly and compactly laid, so that it had the effect of a brownish thatch. The main building (the *shinden*), which contained the rooms of the lord, was connected by bridge-like corridors with the other buildings — the ladies' chambers (the custom of plural marriages was practiced in Heian times and a wealthy

nobleman had two wives and each wife had a number of court ladies), the angling pavilion, the fountain house and other characteristic structures. On three sides of these buildings and galleries was a garden, in which there were necessarily a lake and streams with winding shore lines that touched the verandas of the various pavilions. In the lake there was an islet, reached by bridges with lacquered railings. The trees and stones were placed so as to give the garden the effect of a landscape. The view of the houses from the garden was also picturesque, for it offered the contrast of brown roofs, grey walls and red railings seen through the rich green of the trees and through clouds of pink cherry blossoms."

The city's land all sloped gently to the south, allowing the diversion of water from the canals which followed north and south streets to serve every block in the city. The *Shinden-zukuri*



Torrent-mode

mansions were all very much the same in plan, whether in the planned city or the suburbs, including those of the Fujiwaras in the north. There were approximately 120 sites for the Heian

aristocracy in Kyoto: the entire northern section of the city from ichi-jo (first street) to ni-jo (second street), a distance equalling the depth of the Imperial Palace area in the northern section of the city, which was reserved for the court nobles.

The remains of a royal palace and garden excavated in the capitol city of Po Hai, a Chinese dependency in Manchuria which passed out of existence in the tenth century, bear a striking resemblance to the Byodo-in, which is generally conceded to be the handsomest Shinden-zukuri remains in Japan.

*Sakutei-kei* contains instructions for building cascades or waterfalls, the Yare-no-mizu or drawn water, and a water course with murmuring streamlet, one of the endearing features of the Shinden-zukuri garden, which is still found and much admired today.

We must remember that many of the ideas of the shinden garden came from China and that the Chinese had many superstitions and "taboos" which affected their lives. For instance: the orientation of the house which, from time immemorial, faced the south; the water in the garden which must always follow the course of the sun, from east to south and then west or, according to the Chinese superstition, from the

direction of the Green Dragon to the White Dragon. If this tradition be observed, then the master of the house will be sound in mind and body for a long time. Entrance to a house from the northeast was unlucky, a tradition which still carries over today. In planting, flowering trees were always planted to the east of the house, those with heavy green leaves to the south, those with bright autumnal colors to the west and, of course, evergreens — especially pines — to the north.

Certain elements of religion, government and morals entered into the garden, the soil and, especially, the hill (Tsuki-yama) which represented the Emperor; the rocks, advisors and the water, the subjects. It was pointed out that water flowed only where the soil allowed it to flow and stopped where the soil forbade it to flow. There were literally dozens of other such superstitions.

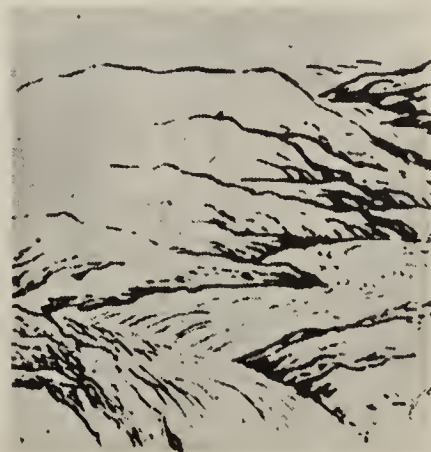
While the *Sakutei-kei* was written almost a thousand years ago and for a different culture than ours, the modern Western landscape architect will find much in the text that is pertinent today. For instance, the author opens the book by saying that the gardener should study the great gardens of the past, the wishes of the owner, the manner of liv-



Mixed



Sea-mode



River-mode

ing of the clients and should also take into consideration the character of the existing landscape features. He should then try to make a garden in the "solution" of these and his own ideas and in a reasonable way; this advice is just as relevant today as it was then.

There are, for instance, six modes of rock arrangement: the sea mode, which employed the feeling of the wind-swept and wave-beaten seashore; the river mode, which imitated the rocks strewn along the course of the streams; the torrent mode, which represented a rushing stream with rocky banks; the marsh mode, where very little rock of any sort was visible and where marsh plants were introduced; the flat mode, which combined flat rocks and appropriate planting; and, lastly, the *Karesan-sui* or waterless mode, where rocks and pebbles were used to form very convincing representations of the natural landscape of streams. The rock-work depended on, first, excellent selection and, second, on equally excellent placement. Naturally, the *Sakutei-kei* devoted considerable space to the selection and placing of rocks with possibly more "don'ts" than helpful suggestions.

The most famous of the *Shinden-zukuri* mansions is the *Ho-wo-do* of

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*Editor's Note:* The foregoing article is an excerpt from a forthcoming book being written by Mr. Popham. The author has spent many years in Japan and is well acquainted with the significant symbolism of its culture, particularly in relation to landscape architecture.

He graduated from Cornell University in 1922 with a degree in Landscape Architecture and made his first trip to Japan in 1929. He pursued his profession in this country with the well-known firms of Olmsted Brothers in Boston, Massachusetts, and A. D. Taylor in Cleveland, Ohio. He spent four years in the instruction of landscape architecture at Iowa State University. Following the de-

the *Byodo-in* Monastery in Uji, erected by Yoshimitsu, son of the most powerful Fujiwara official, Michinaga, in 1052 A.D. Here, to quote Langdon Warner: "By far the most important architectural monument and relic of court life that remains . . . is the Phoenix Hall, the *Ho-wo-do* of the *Byodo-in* Monastery at Uji . . . It was built in the middle of the eleventh century by the Regent Yoromichi under whom Fujiwara wealth and domination was at a splendid pinnacle . . . It was both religious establishment and pleasure palace and here the Regent invited the Emperor, his son-in-law, to enjoy the gardens and the river . . . Such buildings with long, galleried wings and delicate belvederes at their tips are shown down to every detail in the ninth and tenth century Buddhist wall paintings and in Chinese gardens . . . They might be architects' renderings for the *Ho-wo-do* . . . No doubt there were such buildings actually constructed in China according to specifications of divine architects . . . But not one is left."<sup>2</sup>

Five of the traditional modes of rock arrangement are illustrated in this article.

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<sup>2</sup> Langdon Warner, *The Enduring Arts of Japan*

pression, he joined the National Parks Branch of the U. S. Forest Service.

Since his first trip to Japan, the landscape architecture of that country has been a focal point of interest in his career as is evidenced by the insight exhibited in his writing. Mr. Popham was one of the first military governors sent to the island during the occupation at the close of World War II. He resided there for 6½ years.

Despite his military capacity, he was cordially received by Japanese friends and confreres of happier years who respected and admired him for his talent and for his appreciation of the cultural backgrounds which so greatly influenced all art forms in ancient and modern Japan.

# Native Plants

## for Tomorrow.

CHRIS G. MORITZ  
*Landscape Architect*

IN AN AGE of unprecedented technological progress, when science makes new discoveries every day, we seem to realize finally that something has to be done about man's physical environment. We stand at the threshold of a new era. Many of us have preached for years that a healthy and pleasant environment is vital for man's physical and mental wellbeing, that our environment influences us, whether we realize it or not.

Now suddenly there is a public cry for beautification of the country, for open space, for planting along roadsides, for parks and recreation areas. Are we ready for this development, are we ready for it here in the semi-arid and arid West?

As population in this semi-arid region increases, water will become more valuable, and its value will be more appreciated. Water will become more expensive since it will have to be re-used and treated more often. We will be forced to analyze our irrigation practices and eliminate all waste of water. If we are not doing this voluntarily, the increasing price of water will force us to economize. On the other hand, we should make the greatest effort to develop and protect our water resources to the utmost.

What does this mean to people engaged in the development of man's outdoor environment in this semi-arid area? To some degree most of us are engaged in changes of our environment. This means that water will more and more be treated as a treasure. It means that we will on one hand create small outdoor areas with lush oasis-like vegetation and that the large open spaces will have to be left to drought resistant native plants, plants that will grow and thrive with a minimum requirement of water. But . . .

But what do we know about the native vegetation of our state and our region? What do we know about the native plants that surround us when we hike or picnic in the mountains or when we drive through the plains? What do we know about the plants that make up each ecological habitat of our environment? What do we know about the reaction of these plants to cultivation, how do these plants tolerate transplanting? What do we know about the suitability of native plants as nursery stock, about their methods of propagation? What plants have really been checked for their value as landscape material? What selections have been made from the palette of native plant material, selections not

only of botanical species, but of individual specimens within this species. Just as all human beings, zoologically, are called *homo sapiens* — and they vary greatly, thus each pinon pine differs from the other — yet botanically they all are *Pinus cembroides edulis*. One pinon pine will be more suited to cultivation and to a certain location than the other.

To select the most suitable native plants for our use and to study their behavior and values — we have a tremendous task ahead of us. And we cannot afford to wait. We cannot afford to put off this job one more week or one more year. It must be started now because the public will demand the results from us tomorrow. The days of unprecedented need for native plant material are just around the corner. Here are just a few hints:

If we ever want to control urban sprawl and break up the endless monotony of residential subdivisions we will have to organize our cities with meaningful large open areas, break up the mass of structures with greenbelts, wedges of open space. It may then well prove that open space becomes the most valuable space in our cities, not the built-upon areas. Postage stamp-sized parks plunked down into our subdivisions without any relationship to each other, except a spacing of so many quartermiles, are completely outdated. Of course, neighborhood playgrounds and schoolgrounds should still be within walking distance of each home. However the large open spaces in the urban area of the future will be systems of greenbelts.

In order to afford these large open spaces individual sites will be smaller. There will no longer be those wasteful sideyards — one reason for the popularity of townhouses. Different fencing codes will allow fenced in and

usable front yards. Patios and back yards will provide privacy. Such smaller sites will allow the development of large open spaces, areas then that will call for planting with native plants and for seeding with native grasses.

And there will be all these other demands upon our supply of native plant material: the development of large state and regional parks, reclamation of strip mine and dump sites, the development of exhausted gravel pits into recreational areas, roadside planting and industrial landscaping, drainage ways, riverbanks and reservoir sites — they all will call for seeding with native grasses and planting with large quantities of native plants.

And what are we doing while all these developments are occurring, when roadside planting can be legislated from one day to the next whether we are ready or not? I think there should have been, first, legislation requiring the best site planning for our schools, not just fine school buildings, but well planned and well planted school grounds. This is where appreciation of a more beautiful environment will start. There is bitter need for education from kindergarten and grade school on — education about the value of pleasant environment and open space, the value of water and of plants.

And there is bitter need for research on native plant material. We still lack the tools that we will need tomorrow. The only federal research project for horticulture in this area, the Horticultural Field Station at Cheyenne, just recently escaped an economy-move shutdown due to lack of appropriations. To my knowledge there is very little research work on native plants going on at Colorado State University, and yet this work requires time and money for results. Can we afford to wait any longer?

MEMO: *From the Office of the President*

To: *All Plant Sale Volunteers*

This is a message of congratulations and sincere appreciation to all of the volunteers who gave so much of their time and efforts and to those who contributed plant materials to the 1966 Annual Plant Sale. Words are completely inadequate to convey to all of you devoted people the gratitude of the members of the Plant Sale Committee, the Board of Trustees and the Staff of Denver Botanic Gardens.

It is more than possible that by the day the sale started and the long agony of preparation was over, many of you would have preferred to stay at home or "to go anywhere else but that madhouse" — and that it was! It was a rewarding bedlam, however, for the final tallies showed that more than \$6000 was added to the always fluid Denver Botanic Gardens Treasury. This money will help to relieve some of the annual pressure of wondering how we will pay for the many incidentals which leer at the bookkeeper in the form of "2% — 10 days." There was an amazing amount of work done by the volunteers in two days in order to net such a sum of money and gross nearly double that amount.

If it were possible, there would be a sincere note of thanks to each of you in your mailbox; however, many of our good volunteers simply came in and worked and we wouldn't even know how to contact them — they just performed the services out of the joy of helping and remained anonymous.

To all of you then: the chairmen of the many committees; the organizations; those who raised plants and dug them out of their gardens; the wonderful sales people; the cashiers; the tote-out boys; the garden crew; the information specialists; the nurserymen who provided many of our unusual plant specimens; those who gave us such wonderful publicity; those who prepared and served the delightful refreshments: this is our sincere expression of thanks for a job well done!

ELNA GIBSON, *General Chairman*  
PLANT SALE COMMITTEE

LAWRENCE A. LONG, *President*  
BOARD OF TRUSTEES

# FROM THE **TREE TOPS**

THOMAS B. GILBERT

*Gilbert Tree and Lawn Service*

Longmont, Colorado

## *What is more beautiful than a tree?*

IT WAS twelve years ago that I ascended my first tree for the sole purpose of improving the health and appearance of that tree. True, I had climbed many a tree in my younger years, but this time my purpose was constructive! I had been apprenticed by some of the best tree men in the Denver area in the correct procedure. Now, I was on my own, and, suddenly, that tree became the most important project of my life. I'd like to share with you some of the do's and don'ts that I have learned the hard way during these twelve years.

"Woodman, spare that tree" should be the slogan of all tree men. We must remember that trees grow slowly in Colorado and need special care in order to thrive and serve their multi-fold purposes. There are two reasons for trimming a tree:

1. To keep the tree healthy
2. To keep the tree beautiful

By removing all dead wood, we remove breeding places for disease and harmful insects. Branches of weak structure, that might break under the weight of snow or create a hazard in

a high wind, should be removed. These can be a potential danger to persons walking under the trees and to buildings located near the trees — a potential danger that could develop into expensive lawsuits. By trimming, it is possible to keep a tree within the size limitations for which it was intended. It is important to keep the tree tops uncrowded so that all leaf areas get sufficient sun and free air circulation necessary to manufacture sufficient food. Thus, we keep the tree well, healthy looking and in a situation which will enable it to survive Colorado weather without damage.

In carrying out these purposes for tree trimming there are some well-established rules that every good tree man **MUST** follow. Many of our larger cities have incorporated these rules into laws. These we will discuss in our next Tree Tops talk. We hope to bring to your attention many pertinent procedures which are necessary to follow in order to keep your trees, shrubs and lawns in healthy, vigorous condition and beauty. What is more beautiful than a tree? A well-trimmed tree.

# DENVER BOTANIC GARDENS

*A Non-Profit Organization*

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**Sky Pilot**

## ILLUSTRATION SOURCES

*Cover* — Line Drawing by Guy E. Rogers  
*Pages 116, 118, 119* — From the Files of Louisa Ward Arps  
*Page 121* — Pen and Ink Drawings by Polly Steele  
*Pages 122, 123* — Reproductions from *Meet the Natives*  
*Page 124* — Drawing by Lu Wallace  
*Page 126* — Photograph from Files of Dr. Louis B. Martin  
*Page 128* — Photograph by Lloyd Rule, Denver Photographer  
*Pages 131, 132 and 133* — Illustrations from the Original *Sakutei-kei*, as Taken from Books on Japanese Garden History  
*Inside Back Cover* — Pen and Ink Drawing by Susan Ash  
*Outside Back Cover* — From Files of Denver Botanic Gardens.

## ERRATA

The following corrections are made in the text appearing in the May-June issue:  
Page 61, column 2, line 22 should read: The Carousel projector used in this program is a gift from the Presidents' Council of Denver.  
Page 110, column 1, third line from bottom should read: Kathryn O. Kalmbach Herbarium.

# *The Green Thumb*

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Botanic Gardens House

## DENVER BOTANIC GARDENS

DENVER, COLORADO

*This is a non-profit organization supported by municipal and private funds.*

A botanic garden is a collection of growing plants, the primary purpose of which is the advancement and diffusion of botanical knowledge. This purpose may be accomplished in a number of different ways with the particular placing of emphasis on different departments of biological science.

The scientific and educational work of a botanical garden center around the one important and essential problem of maintaining a collection of living plants, both native and exotic, with the end purpose of acquisition and dissemination of botanical knowledge.

# *The Green Thumb*

SEPTEMBER/OCTOBER 1966



THE COVER Stand of Aspen trees in Colorado Rockies

*THE GREEN THUMB*

VOLUME TWENTY-THREE, NUMBER FIVE

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# *The Green Thumb*

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HELEN M. VINCENT, *Editor*

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# KALEIDOSCOPIC

## MOUNTAIN

## PARKS

M. WALTER PESMAN

WHAT IS A Mountain Park? You must see it, smell it, sense it, let it get under your skin — mere definition will mean little.

To be initiated, a trip from Denver to Buena Vista will do. We have left the plains at Morrison and entered Turkey Creek Canyon; from Conifer to Bailey we have gone up and down a number of ridges, then followed the North Fork of the Platte River. With all of the changes we have seen thus far, it would seem that there would be nothing left in the way of mountain scenery to take us by surprise. Then, suddenly, as we get to the top of Kenosha Pass and turn the corner — here is South Park stretched out before us . . . another country, part of Fairy-tale-land! A quiet, green meadow-land!

Roundabout are the snow mountains — calm, majestic, sharply outlined.

against the blue sky, contrasting with the grassy, restful field. Most likely, there are a few traveling shadows. In summer time there are immense stretches of wild flowers: red, purple, yellow, depending upon the time of the season, which finishes with the glorious deep blue of our native gentians. All about is the brilliant sunshine.

Such is South Park. Estes Park is just as striking. North Park and Middle Park have their own individual beauty, but with the same charm.

Why “kaleidoscopic”? A kaleidoscope, invented by Sir David Brewster, is a fat tube “which contains loose fragments of colored glass and reflecting surfaces so arranged that changes of position exhibit its contents in an endless variety of symmetrical varicolored forms.” To the not-too-sophisticated child, a kaleidoscope furnishes endless

delight — an entry into the *Tales from the 1001 Nights* of Scheherezade.

Likewise, the not-too-sophisticated adult can find unending pleasure in observing the ever-changing patterns, in color and texture, as the seasons progress in a Mountain Park.

Spring does not come early at those altitudes; South Park ranges from a low of 9,000 feet above sea level to a high of 10,500 feet. The rim is generally at about 10,000 feet, which is the height of Kenosha Pass at the north end; Trout Creek Pass, at the southwest exit, is at 9,346 feet.

You'll be disappointed if you expect much bloom before the beginning of June. I found one exception on a sunny slope in May, where the colors were those of the American flag: red for the Indian paintbrush (*Castilleja*) white for candytuft (*Thlaspi*) and blue for chiming bells \*(*Mertensia coricea*) and others.

The real parade begins in June with large fields of the native iris, a light blue "flag" (again the flag, you see) which is called Rocky Mountain iris in the book of Standardized Plant Names. This plant was labeled *Iris missouriensis* by early scientists in an attempt to claim it for Missouri! The interesting thing is that Missouri does have seven kinds of native iris, but not *Iris missouriensis*. Evidently, to Thomas Nuttall (1786 to 1859), whose name is attached to the species, everything west of the Mississippi River was Missouri!

Golden banner (*Thermopsis divaricarpa*) blooms in South Park in June, after having "come up" from lower altitudes during April and May. It is a striking, yellow pea-flower, like a golden sweet pea. Its dark green leaves occur in threes, similar to clover. Since it has deep rootstocks, it can stand

abuse, drought, trampling, and still spread.

Toward the middle of June, the Park is apt to show extensive patches of



BLUE FLAG  
*Iris missouriensis*

pinkish-red: shooting star \*(*Dodeca-theon pauciflorum* and *D. raticatum*) has come into bloom. Here is a beautiful sight, both from a distance, where the red shows up doubly clear against the luscious green of the meadow, and close up. The name shooting star is indicative: a dart-like flower of five purplish-red parts, gathered to a white point (hence, the pink color combination), ending in a black barb—the stamens. Each flower is pointed downward, all spring from one point, topping the reddish, fleshy stalk. Dark green, fleshy leaves spring from the base only. Bird-bills is another name for this flower; also American cowslip.\*

While the wet meadow adorns itself with red, the hilly ground farther south is yellow with wallflowers and with an interesting flat-topped low plant of the sunflower family, the Colorado rubber plant \*(*Hymenoxis floribunda*). When tropical rubber was not available during the war, this native

was being considered as a substitute, but that idea was finally discarded in favor of guayule, a native which grows farther south. There is also some red



FRINGED GENTIAN  
*Gentiana elegans*

paintbrush much in evidence in this area.

An unforgettable sight is yours on the 4th of July if you can drive through South Park by moonlight when the Rocky Mountain loco (*Oxytropis sericea*) is in full bloom. Imagine fields of spectral-white flowerstalks, tending toward lavender, like a mass of ethereal, sizable, sweet peas. They are along the roadside and they vanish into the distant fields, indistinguishable from the moonlight itself.

Even in daytime these masses of Rocky Mountain loco are impressive; by moonlight, at the peak of their bloom, they leave an impression that is "not of the earth." Could it be that the very sight of this locoweed makes even a human being "loco"? (In Spanish the word "loco" indicates madness).

The height of glory is reached in mid-July. South Park is now a veritable

carpet of bloom. Not only one or two plants take the stage — there is a variety of form, variety of color and variety of texture. Even the reddish-brown patch of soil here and there fits into the color pattern. To complete the picture, one needs to see the ruddy glow of the evening sun's rays on the hills of Red Hill Pass, which is in the middle of South Park.

Shooting star is still showing its light red mass effect; in the meantime, another plant has added a darker red, almost purple color: purple lousewort (*Pedicularis crenulata*). It is not as delicate a flower as shooting star; its snapdragon-like blossoms crowd the central stalk, but they are interesting with their curved hood and large lower lip. The scalloped, narrow leaves tend to give the whole plant a sturdy appearance.

A third reddish tint is beginning to be evident, due to little red elephant, one of those flowers that "just can't be," but is just the same. More about this one, later.

Now, let us look the other way — where golden banner used to reign or where the Rocky Mountain loco attracted elves in the moonlight. Both are practically gone, just as the blue iris can hardly be identified now. Yet here, along the roadside, is a lovely, harmonious color combination of golden yellow and deep bluish-purple. The former color is that of one of the numerous *Senecios* and the latter of the Colorado rubber plant. This rubber plant is a striking, upright mountain beardtongue (*Penstemon glaber* and *P. alpinus*).

All beardtongues have an irregular "gaping" flower with an upper and a lower lip. The reason they are called *Penstemon* (or, formerly *Pentstemon*) is that they have an unusual fifth stamen (pente is greek for five) which is

always sterile and which may, or may not, be bearded (hairy), resulting in the name, beardtongue. There are four fertile stamens in addition to this



BEARDTONGUE  
*Penstemon glaber*

“dummy.” Knowing that little secret, one should not have too much difficulty in recognizing a penstemon, whether it is tall or small, purple (as it usually is) or red or white.

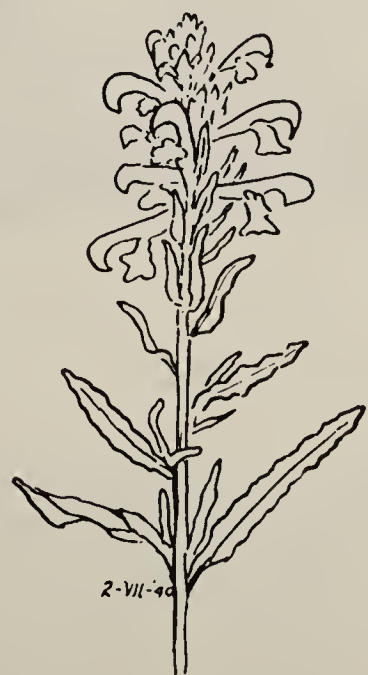
This mountain beardtongue is a stout, tallish plant with dark green leaves and dark purple, good-sized flowers on a thick stalk — definitely decorative.

You may find close to it, along the highway's gravelly bank, a ground cover of an entirely different sort of *Penstemon*. These are regular cushion plants with their unmistakably beardtongue flowers, closely hidden by the foliage or displayed on it. The sprawling beardtongue (*Penstemon crandalli*) is one of the most beautiful ones, with two or three good-sized flowers together, three-quarters of an inch long, with a moderate swelling in the throat. (No, that sounds like a bad case of tonsillitis). I mean to say that

the flower flares out, with a sort of bulge as it flares and then divides into two parts — the so-called upper and lower lips. The sterile stamen is somewhat hairy (bearded), and the throat itself has a few long hairs. The numerous leaves are narrow and have a good green color, not grayish as in so many plants in dry locations.

Gem-carpet beardtongue (*Penstemon harboursi*), another sprawling type, has thick, roundish leaves and orchid-colored flowers which have less of a flare but are almost as long. Well, we could talk about beardtongues a long time because you might find a low, upright kind or another cushion type with grayish leaves. But other flowers draw our attention, at least in the late afternoon.

Those masses of star-shaped, golden blossoms, on dry ground, are apt to be the yellow evening star (*Mentzelia multiflora*), most common at lower altitudes. It is a freely-branched plant, a foot or so high with strongly-waved leaf margin. Do you want to make quite sure it is a *Mentzelia*? Pick off a little branch and throw it at your



PURPLE LOUSEWORT  
*Pedicularis crenulata*



Little Red Elephant  
*Elephantella groenlandica*

neighbor's coat. If it sticks by its barbed hairs — it has proved its name.

That "stuff" looks like wild barley along the roadside — well, that's just what it is: wild barley (*Hordeum jubatum*) also called squirrel-tail grass. Watch it later in the season when it

turns pink or even dark red — a striking sight.

\* \* \* \* \*

Time flies. It is now almost August in South Park. A great change has taken place in the last week or so. Instead of a colorful carpet we find the

green-green-green of the extensive meadow. Here and there a purple patch remains: little red elephant is not done yet, but the freshness of first bloom has passed. Only by close scrutiny can we get the thrill that always comes with the discovery that here is an exact, though tiny, replica of an elephant's head with long trunk, floppy ears and even an apparent eye. Its color is purplish-red, probably the nearest anybody can come to seeing honest-to-goodness "pink elephants." A single stalk may show as many as two dozen elephants' heads with their trunks raised at all sorts of weird angles.

Here and there, in the green meadow, is a white patch of bistort (*Polygonum bistortoides*) waving plummy, dense, white spikes of tiny blossoms in the wind. Bistort belongs to the buckwheat family and somewhat resembles its cousin, which has rose-colored flower spikes and occurs at lower altitudes in marshy places. Its leaves, however, are mostly found at the base of the plant only — they are like a pointed peach leaf.

One patch of golden-yellow, in the north part of South Park gleams out as a sunshiny relief against the constant green. It looks like a tall dandelion. In fact, it is called tall false dandelion (*Agoseris glauca*) and has the same kind of milky sap. However, its leaves are quite different: they are pale green and narrow, not scalloped.

Certain to draw attention at this time of the year is a peculiar thistle (*Cirsium drummondii*). Now, I know well enough that, to most people, one thistle looks like any other thistle, except for the color of the bloom. This one is different even if it does not have much of a bloom, which is just a washed-out pink or white in color. It's the plant itself that is peculiar. It resembles

bleached endive but has a much coarser texture and is quite spiny. There is a spiderwebby substance in the heart of each plant that makes the bleached appearance all the more interesting. One variety of this thistle has its flowers nestled close in, with no flower-stalk. This is not unusual as we approach timberline. Why? And why the bleached appearance? These are questions only botanists can answer.

\* \* \* \* \*

August 31 and still the flower parade is not over. This is the time when Rocky Mountain fringed gentian (*Gentiana thermalis*) is in full glory. Its former botanical name was *G. elegans* which is more indicative of its appearance.

Every flower lover realizes how difficult it is to give anything like an adequate description of this graceful, chaste and refined-appearing blossom. Mention, in botanical terms, the four fimbriate, dark blue corolla lobes, the four equal and similar calyx lobes, equalling the tube, the three to six pairs of obovate to oblong sessile leaves on each stem and the fact that this is an annual, two to three decimeters high, branched from the base — what have you? A very poor substitute for a gentian! The poet does his best in saying:

"Then doth thy sweet and quiet eye  
Look through its fringes to the sky,  
Blue, blue, as if that sky let fall  
A flower from its cerulean wall."

William Cullen Bryant

Perhaps, in your imagination, some of you are already back in the meadow, surrounded by fringed gentian and close kin: blue marsh gentian, star gentian, the white, tight-flowered gentian, all apt to be in close proximity.

You feel the fresh mountain air, you smell the fragrant hay, now in wind-

rows or stacks, you hear the song of the western meadowlark and of the elusive western savanna sparrow and you see Brewers' blackbirds and killdeer plovers in profusion.

Now, let us have a last glimpse of South Park before winter sets in. Until frost comes in September, gentians continue to exhibit their beauty. Tansy asters (*Aster tanacetifolius*) and others cheer us along the roadside with their numerous purple blossoms and characteristic odor. Here and there a late Indian paintbrush contrasts its scarlet dash with a few pink fairy trumpets still in bloom.

As would be expected in fall, yellows are going strong. There is an attractive sulfur-yellow *Senecio* or groundsel with threadlike leaves, one to two feet tall and bushy (*Senecio spartioides*). It is found all the way up from the plains.

Shrubby cinquefoil (*Potentilla fruticosa*) still continues to show its five-petaled, yellow blossoms — it has kept up the display during the entire summer: a cheery flower against dark green, five-parted leaves (hence, its name — "cinquefoil"). The Colorado rubber plant, which changed from yellow to old gold, is now winding up the season. Tall false dandelion is in "plume"; wild barley is spectacular with its masses of pink seed heads bordering the roadside.

South Park's harvest time is here: its extensive meadows furnish luscious and nourishing hay. Park County, in which it is located, has over 43,000 acres in hay, producing well over 30,000 tons of the crop.

Once more South Park returns to its green-green — now with a brownish cast, variously tinted by patches of sunlight and shade. Once more the mountain tops dominate it with evergreen

and stands of golden aspen, which break up in smaller patches in amoeba-like formation. The few bare hills inside the park emphasize, with their windswept pines, the quiet stretches of meadowland. South Park is preparing for its winter sleep.

Come through South Park in January and you'll find a glittering snow carpet serenely spread before their majesties — the mountain tops.

\*Why people insist on giving this homely name to so many plants is beyond me. The Anglo-Saxon origin belongs to the yellow primrose. Marsh marigold has been afflicted with it as well as Virginia blue-bells. It has even attached itself to a bulbous plant of South Africa — the *Lachenalia* — grown as a greenhouse plant. A cowslip by any other name would be much sweeter — methinks!

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\**Mertensia coriacea*. The name has been changed to *Mertensia viridis*.

\**Hymenoxis floribunda*. The name has been changed to *Hymenoxis richardsonii*.

\**Dodecatheon pauciflorum*. The name has been changed to *Dodecatheon pulchellum*.

\**Elephantella groenlandica*. The name has been changed to *Pedicularis groenlandica*.

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# The Old Cemeteries—

## *now Denver Botanic Gardens*

S. R. DEBOER

AS I RUMMAGE around among the inner cells of my grey matter, the accomplishments in the Denver Botanic Gardens of today thrill me more and more. No more of the little two-by-four conservatory we had, which finally found a place in the City Park Zoo. Instead, there is this impressive structure in which a genius in horticulture is giving us a view of tropical plant life we have never before witnessed on such a scale in Denver.

I was asked to write about the history of the Denver Botanic Gardens site. There are several phases of it, but I will begin with the last one: York Street, in years past, was a rather quiet street. On its east side, from about 900 north, was a Jewish cemetery — on its west side, a Catholic cemetery. There was considerable objection to a cemetery in a residential neighborhood, although history proves that the deceased residents antedated the living ones by many years. After considerable negotiation, the City acquired the property on which the cemeteries were located and the bodies interred in the Jewish cemetery were removed to a later and more appropriately developed area. The same procedure was followed for the deceased in the Catholic portion and the recovered land became, for a period of time, a barren, weed-infested waste.

The City then began developing Josephine Street and allotted the Jewish cemetery portion of this area to the

Water Department (east of Josephine Street). The section between York and Josephine Streets was set aside for a parking area and, possibly, a future mountainview point. The area west of York Street was reserved for a park by the City Council. This was considered a great victory for the residents in the area who had suffered for years under the lugubrious proximity of funeral processions and burial services.

The future site of Denver Botanic Gardens was therefore established. However, it took dedicated and devoted work on the part of many people to accomplish the end result. There were, in Denver, many who believed in the cultural and, in this case, the horticultural future of the city. They realized that this piece of high land, thousands of meters above the American plains, was unique. Its skies were a clear, sometimes even harsh blue, as compared with the greyish-blue of lower altitudes. They knew that topsoils and humus were low, except in valleys, and that they were alkaline rather than acid. They also knew that flowers were brighter in color, and trees and their roots were sturdier, even though often less in stature. Altogether, here was a large plateau island of unusual characteristics in climate, soil and air. Their unceasing attempts to bring horticultural progress and beauty to Denver were abetted by the development of the cut-flower industry, notably carnations. Rockyford canta-

loupe, pascal celery, high quality sugar beets and other produce became a source of great pride as well as industry.

So, when the land on York Street was acquired as a site for Denver Botanic Gardens, those who had worked so hard were elated. The headquarters, Botanic Gardens House, located at the south end of the garden, was given to the organization by Mrs. James J. Waring in honor of her father, the late Henry C. Porter. Many other large donations were received in order to implement the work needed to transform the barren area into a garden where work and research could be performed for the benefit of Denver area gardeners. Those who rested in the early cemeteries are now forever memorialized by the living Gates Memorial Garden, the lovely Herb Garden and the contemporary Lew Hammer garden, as well as the many test gardens for iris, dahlias, roses, gladiolus. Now, the Boettcher Conservatory.

Much was accomplished under the efficient direction of Dr. A. C. Hildreth by the Denver Botanic Gardens Board and the City and County of Denver. I can hardly realize that our early dream of a large conservatory would ever come about. So much of the beauty in Denver donated by private citizens, was the outcome of Robert Speer's appeal: "Give while you live! Don't memorialize your loved ones in a cemetery!"

As my mind flutters back to those days, half a century ago, I can still see the early flower shows in the Auditorium. Some of the promoters are still around. I remember the revival of the Horticultural Society (Colorado Forestry & Horticulture Association) with its headquarters on Bannock Street, donated by Mrs. John Evans, and the hundred-acre site set aside in City Park for the creation of a Botanic Garden. This area eventually hosted the Robert More evergreen collection and the collection of flowering crab apples, the creek effect done by John Gates, all under the enthusiastic leadership of Mrs. John Evans. The trees are still there today and the people who worry over the hardiness of evergreens can still see the varieties that Bob More planted there—varieties we *knew* were not hardy in Denver . . . but there they are.

The story of the Denver Botanic Gardens and its efforts toward improving ornamental horticulture is an important part of the history of Denver. These efforts and the many people behind them helped to change a bleak mining town into a beautiful liveable city. Many of the early meetings may have seemed without results but each contributed its share to the goal now achieved. What Denver is today she owes partly to the men and women who steadfastly promoted the "city beautiful" idea.



Reservations for guided tours of the Conservatory at Denver Botanic Gardens may be made by calling the Conservatory number, 297-2348, between 9:00 a.m. and 4:00 p.m. daily.





Evidence of What Botany and Horticulture Have Done for the Denver Area

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## Signs of Life and Death

“We took a hasty dinner at Running Creek, then made our slow way, with poor horses, across the ridge to Cherry Creek, which we struck about 15 miles above Denver. Up to this point we had found no settlement, except two or three grazing ranches.

“The ride down Cherry Creek through sand and dust, on the banks of the muddy stream, was the most tiresome part of the overland journey. Mile after mile went slowly by, and still there was no sign of cultivation. At

last, four miles from town, we reached a little tavern\*, beside which grew some cottonwoods. Here there were two or three ranches in the process of establishment. — — — Our next sign of life was the evidence of death — the unfenced cemetery of Denver on the top of the ridge. I looked out ahead from time to time, but could see neither horse, tree, fence or other sign of habitation.”

BAYARD TAYLOR  
June 19, 1866

\*Site of the present 4-mile Tavern.

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The above excerpt is of particular interest to those who read Mr. DeBoer's account of the original purpose of the ground on which Denver Botanic Gardens is now built. Mr. Taylor was a writer for

the New York Times and this article is taken from one of the letters he wrote on this trip. His work was later compiled in a book published by G. T. Putnam & Son, New York, in 1867.

# William Newton Byers,

## Pioneer

*Here is the story of one of Colorado's early horticultural pioneers that everyone will enjoy reading. Written after much research by MISS OLIVE HENSLEY, gardening enthusiast, who is a former Librarian at Opportunity School.*

THERE WERE farmers as well as gold-seekers among the colorful, vigorous settlers of our state; and William N. Byers, though his first claim to fame may be that of the West's leading early editor, was by knack and by nature, a farmer. Born on a farm in Ohio in 1831, he was educated in that state, leaving there to travel as a surveyor, "seeing the country," until he settled in Omaha, in 1854. He stayed there until 1859, when he heard the call of the farther West, and came to Denver by wagon-train, "with his shirt-tail full of type, to found the Rocky Mountain News."

From the beginning he championed the cause of agriculture, sure that the state's eventual place in the sun would come through farming, even though

mining seemed all-important at the time. So, though he personally investigated and chronicled its every exciting event in those turbulent times, and news of the mines most often made the headlines of his paper, his editorial pages were chiefly devoted to promoting the country's agricultural stature. History gives some of these same editorials credit for first presenting ideas out of which grew such great things as the Federal Reclamation Act, wheat farming in Colorado, and the beginnings of our famous sugar beet industry.

Soon after his arrival in the state Mr. Byers got himself a farm, a couple of miles from Denver, in what is now the Valverde district, within the present city limits, staking his claim as the

pioneers did, since the Homestead Act was not made law until 1862. By the fall of that same year, he had found time to cultivate fifty or sixty acres of it, and his skill as a farmer is attested

by the remarks of a fellow editor, Alfred Thomson, of the Miner's Register of Central City. "Here are melons of every variety, vegetables of all kinds — potatoes, tomatoes, onions, eggplants,



**Old Home of William N. Byers, Taken in 1862.**

*Photo Courtesy of Denver Public Library.*

beets, peas, beans and everything that grows in this country. His corn will yield at least sixty bushels to the acre. Should the News Office fail to yield a sufficient income, there is no danger that Byers will suffer for the good things of life; for we presume that he will realize \$2,000 or \$3,000 per annum from this ranch besides supplying his own table."

Some one else remarked that the Rocky Mountain News Office during August of 1860 was a veritable exposition in itself, the first ever held in this region. Mr. Byers had invited farmers and gardeners to bring in samples of their grain and vegetables, the result justifying his optimistic judgment as to the soil fertility of the new country.

In 1861, though it would seem that these hardy adventurers had barely settled in after their long, hard journey across the plains, we find them calling a meeting for the purpose of organizing an Agricultural Society. This venture was backed by the News editorials, maintaining again that "agriculture is paramount, and without farming, gold and silver mean nothing."

In spite of this good propaganda, however, the idea was a little ahead of its time, and it wasn't until 1863 that the Society really came into being, with Mr. Byers as secretary and member of the committee for the drafting of the Constitution and By-Laws. Encouraged by this accomplishment, their eager minds jumped ahead to holding a Territorial Fair in the coming fall, under the auspices of the new organization. But even though Governor Evans joined in urging the idea, it didn't materialize until 1866, when Mr. Byers was among the exhibitors.

This first Fair was a great success, if we may believe the newspaper description, which exulted that "the size and quantity of our vegetables are

wonderful to recent arrivals in Colorado. Turnips as big as pumpkins and weighing over fifteen pounds together with beets that beat all creation . . . Corn raised on the highlands 11 feet in height and ripe enough to defy the grasshoppers."

Though, at this distance from those early days, traveling sounds to us more like a chore than a pleasure, they did get around and in 1873 we find Mr. Byers attending the Agricultural Congress in Indianapolis, along with the delegates from 24 other states. He was then a member of the Committee on Public Lands.

In 1880, there were enthusiasts ready to undertake the founding of a Horticultural Society. Mr. D. S. Grimes was one of the leading spirits in its organization and became the first president, receiving seven votes, five more than Mr. Byers had. Perhaps the "sensible talk on the subject of fruit growing and its promotion," which he made at the meeting, raised his stock the extra five points. An editorial of that time urged that it was the duty of every man who had the welfare of his state at heart to contribute his mite to the success of the Society. It was decided that some subject of general interest to the farmers would be discussed at each meeting. The fact that the subject chosen for the first meeting was irrigation shows how vital it was to every one of them.

The Horticultural Society staged its first exhibition in 1881 in a tent 300 feet in circumference, made especially for the occasion. This enterprise had the backing of the florists of the community, of whom there were then seven, and of the professional growers of fruits and vegetables, of whom there were 65. The interest of the townspeople in planting and beautifying their city is shown in the fact that, in addi-

tion to the local stock, 21 carloads of nursery stock had been shipped in that spring.

A later exhibition of the Society is of interest to us because of an announcement in the News that "the attraction for today's session, the concluding one, will be a paper on 'Shade Trees,' which W. N. Byers of Denver, President of the State Forestry will read." This paper, telling of the trees which he had grown and the problems he had encountered and his conclusions thereon, is of such interest that it is hoped that it will be possible to print it in its entirety in some future issue of the Green Thumb.

Water, or the lack of it, played a leading role in the dramatic development of the West. Samuel Bowles, an early traveler, here, painted a grim picture of our country in 1885, which, while certainly exaggerated, serves to point up the part irrigation played in growing much of our present beauty and prosperity. It reads in part: "Trees will not live in the house-yards, house owners can have no turf, no flowers, no fruits, no vegetables — the space around dwellings in the towns is a bare sand relieved by infrequent mosses and weeds. The grass is gray upon the plains; cottonwood and sappy pine are almost alone the trees of the mountain region; no hardwood is to be found anywhere; and but for the occasional oases by the streams, and the rich flowers that will spring up on the high mountain morasses, the country would seem to the traveler nearly barren of vegetable life."

There are a number of stories of the beginnings of wheat farming in Colorado, most of which give the credit to Mr. Byers. But his own account simply says that "it is remembered by the author and other settlers of that day, that two or three heads of wheat were

discovered in a lot on Larimer street, near 15th in Denver. The seeds had been dropped from an emigrant wagon in the summer and were thus late maturing. The heads were of splendid form, the grain of unusual size and fine appearance. This circumstance at once gave the suggestion and the start to wheat planting."

There is as yet no complete biography of Mr. Byers; but, from an idea of what he personally was like, a sketch by Albert B. Sanford, of the State Historical Society tells us that he was "a man with a most kindly eye, a frame strongly knit, sandy hair and beard. Always affable, easily approached,



*Acer saccharinum, Silver or Soft Maple*

ever ready for a gracious word and a helping hand to friends."

He lived in several homes about the city, in his years here, and around all of them he lovingly planted trees, shrubs and flowers. An article in Trail and Timberline from June 1931, called "In Quest of the Unusual Among Den-

ver's Trees," describes those around his last home on South Washington street, which was torn down to make room for the Byers Junior High School, though the trees, of course, have been carefully kept and tended. Mr. Pesman writes:

"Is the American chesnut hardy in Colorado? Well, there is a full grown specimen on the Byers Junior High School Ground . . . The bur oak there is as beautiful a specimen as I know. Here we have a wealth of trees not found in any other small ground in Denver. We should notice a very large hackberry directly south of the building. A full grown Kentucky coffee farther south, the black walnuts on Pearl street, the linden, Norway, and sugar maple (side by side) and plane trees (or sycamore) on Washington street . . . a small horse chestnut north of the old residence planted in 1897 . . . It is now gorgeous when in bloom and bearing fruit each year. White birch, cutleaf, soft maple, apricot, hawthorn, mulberry — Mr. Byers succeeded in growing them all."

One of Mr. Byers' friends, Florence Burton, wrote: "In Denver's City Park stands a line of noble trees, the first and largest there, which were planted by Mr. Byers with an eye to the future. Leafy monuments to his memory, were there no other." Attempts to find out exactly which ones there were have been unavailing. But another of his friends remembers, as a little girl in the old Broadway school, being taken to City Park with other children to plant trees on a long-ago Arbor Day. The holes were all dug and the trees waiting to be planted, on the road beginning at the 18th Avenue entrance and winding in front of the greenhouse. So, for lack of evidence to the contrary, why not accept these, as the first trees planted in City Park?

Under the heading "Local Brevities"



in the early paper, Mr. Byers and his staff kept track of important small things, as follows:

"Some of the trees and gardens along Broadway and the adjoining streets are being badly mutilated by vagrant cows, whose proper place is either in their owner's stables or in the public pound."

And he follows a note of the bending of a local orchard under a load of fruit with the observation, "Let the croakers who aver that fruit can't be grown here, make a note of the above."

Another time he reminds his readers that "maples and box elders are said to be the best species of shade trees to set out. Citizens should bear this in mind."

And, if he were alive today, I am sure at this very time he might be in the process of writing an editorial for his Sunday edition, urging "that it is the duty of every man who has the welfare of his state at heart to contribute his mite to the success of the movement to secure an arboretum for his favorite city."

# Denver's First Arboretum

*William Newton Byers*

FOLLOWING IS A LIST of some of the trees planted by Mr. Byers, subject of the preceding article, the problems encountered and the conclusions he drew. This material taken from a paper he read before the Horticulture Society about 1881, appeared originally in the September-October 1945 issue of *The Green Thumb*.

## WESTERN BROADLEAF COTTONWOOD (*Populus sargentii*)

Mr. Byers says: "The first trees planted in Denver were set in the spring of 1865, if I remember correctly, and were cottonwoods. That was the first year we had any water upon the townsite for irrigation purposes and we had but little at that time. A little ditch was dug by Surveyor General Pierce from Cherry Creek, leaving the creek at the Broadway bridge and coming out on the townsite. Surveyor General Pierce, Judge Steck and Mr. Tritch planted a few trees, and possibly a few others planted some.

"I planted some trees along Arapahoe Street near Fifteenth in the spring of 1865, and I watered them with a bucket, carrying the water from the Pierce ditch. That was the beginning of tree planting, and it was successful, so that the next year a good deal of tree planting was done. Our trees were mostly cottonwood, and since that time the cottonwood tree has been abused a great deal. Some people complain that it is not neat and handsome, and even that it is a nuisance. I think it is an

unjust charge. While the cotton does fly from the trees during a certain short period of the summer, and is somewhat disagreeable, yet it is seldom so, for it is what some people term as clean dirt. There is nothing unhealthful about it and not much that is disagreeable. It is a native of the country. It makes a shade tree quicker than any other, and I still think a good deal of the cottonwood shade tree, as most old timers do."

## BOXELDER (*Acer negundo*)

"The next tree planted was the boxelder; that, too, has since come in for a great deal of condemnation because it is infested with worms. That condition did not exist in the early days, and does now only in places. The pest began, according to my observation, along Champa Street in 1889 or 1890, and it has spread gradually from that point in a southwesterly direction pretty well throughout the town."

Worms and beetles make the boxelder unattractive to many people today, but not so, with this optimistic pioneer, who added, "It will certainly have a tendency to encourage bird life in Denver."

BLACK LOCUST (*Robinia pseudo-acacia*) was "entirely free from worms," in these days, and the two magnificent specimens near Grant Avenue in the Capitol Grounds attest this fact.

Our native WESTERN LOCUST (*Robinia luxurians*) was liked by the

Byers, though not as much as the BLACK LOCUST, or the COMMON HONEYLOCUST (*Gleditsia triacanthos*) both with and without thorns.

RUSSIAN OLIVE (*Elaeagnus angustifolia*) is today frequently planted to attract birds. Mr. Byers used the fruit himself, as well, for he writes: "The tree blossoms late in the spring, but generally has a full crop of fruit. One year I experimented in pickling some, and after having forgotten to take them out of the brine for about a year, I found that they had a very natural taste. However, they were small. I do not know if they would be of any value unless they would produce oil. If they will do that it might be made one of the most productive fruit crops in the country. It is as hardy as the cottonwood, and its growth is pretty nearly as rapid. The tree is a pleasant feature in the landscape, because of its variation from the common color of the foliage of other trees. It has a whitish color, and the branches are exactly like the olives of commerce. The olive from the tree is a pleasant tasting fruit, and to eat a common olive of commerce alongside one of these, it would require an expert to tell the difference."

ELMS (*Ulmus*) were planted but a "Crimson leaved elm," possibly *U. rubra*, proved wholly unsuited to this area.

ASH (*Fraxinus*) did well for a number of years but then "was troubled with borers and it looks to me as if they will be destroyed."

SILVER MAPLE (*Acer saccharinum*) was a "good tree," but was a "little subject to being broken from a strong wind or a snow." Byers preferred the slower growing Norway maple (*A. platanoides*), "a good sturdy tree."

OAKS formed a prominent part of the Byers collection. The BUR OAK

(*Quercus macrocarpa*) was his favorite, and the noble specimen at Byers Junior High School furnishes today tangible evidence of the great value of this tree. Another oak with brilliant fall coloring (possibly *Q. coccinea*) did very well, but his SWAMP OAK (*Q. falcata pagodaefolia*) and what he calls the PYRAMIDAL OAK had a disposition to winter kill.

RUSSIAN MULBERRY (*Morus alba tatarica*) was attractive to birds but suffered much from a September snow. At the same time, his "plantation of WALNUTS (*Juglans*) happened to be very full of fruit and was almost destroyed."

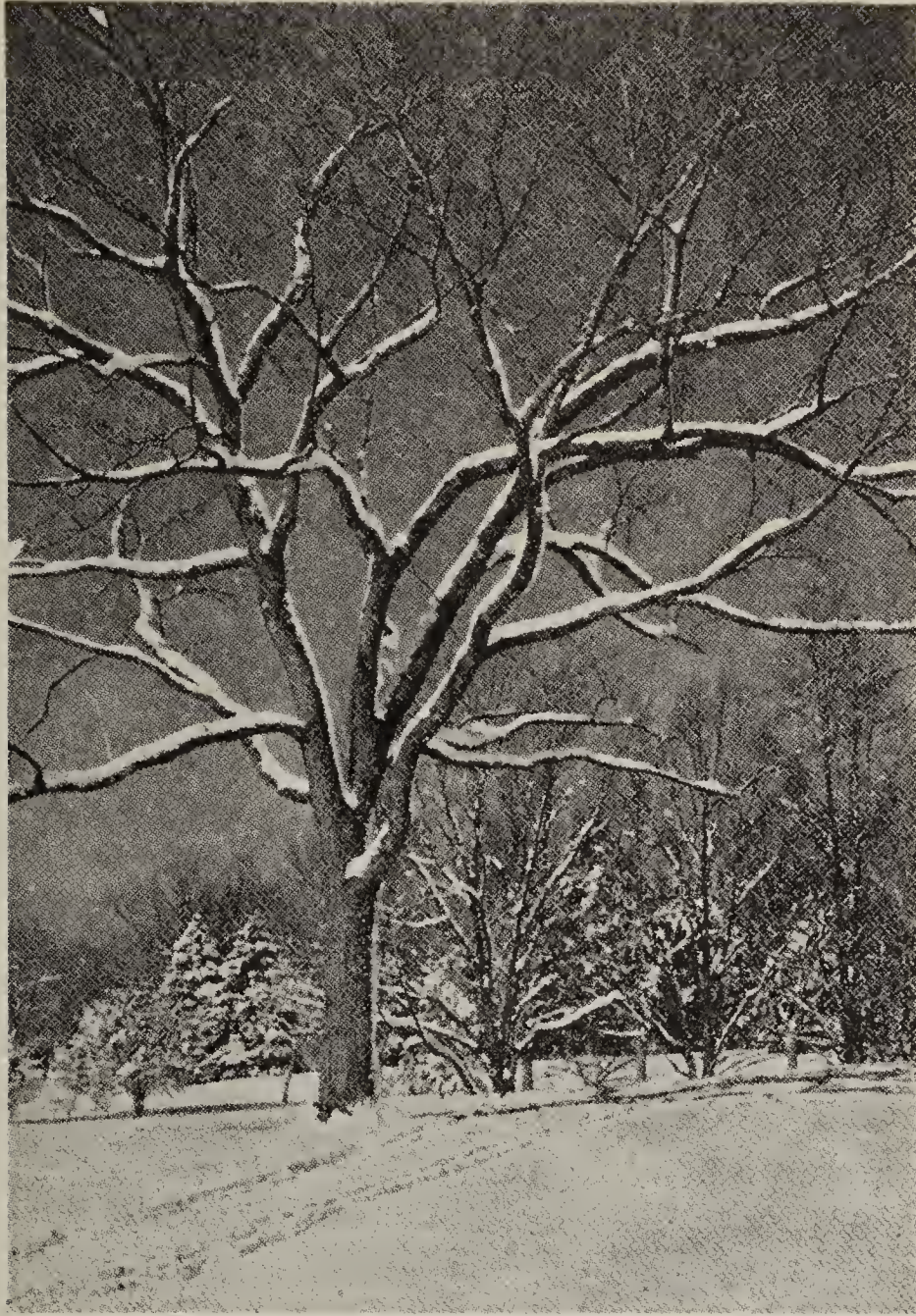
"The BALM-OF-GILEAD trees (*Populus candicans*) have done well too. The balm-of-Gilead is a very rapid grower and very handsome and attractive, but is the second to fall a victim to the borers. The first tree most likely to be attacked by the borers is the CAROLINA POPLAR (*P. canadensis eugenei*). I have some of them and the borers have cut most of them down."

WHITE BUCKEYE (possibly *Aesculus glabra leucodermis*) which was "a tree I wanted very much to grow and preserve," died after "a year or two."

BUTTERNUT (*Juglans cinerea*) and BLACK WALNUT (*J. nigra*) were both "valuable shade trees" the latter being the faster grower.

The review is concluded with a discussion of BLACK CHERRY (*Prunus serotina*) which Byers took "a great liking to" but felt was unsuited to city planting because it was "too attractive to the boys. In the spring they break down the trees to get the blossoms, and if there is a stem left in the fall they will break down the trees to get the fruit."

As is pointed out by Mr. Pesman in



Graceful Beauty Outlined in Snow

*Trail and Timberline* for June 1931, Mr. Byers also grew successfully AMERICAN CHESTNUT (*Castanea dentata*), COMMON HACKBERRY (*Celtis occidentalis*), KENTUCKY COFFEETREE (*Gymnocladus dioica*), AMERICAN LINDEN (*Tilia*

*americana*), SUGAR MAPLE (*Acer sacharum*), SYCAMORE (*Platanus occidentalis*) and CUTLEAF WEEPING BIRCH (*Betula pendula*).

Truly Byers Junior High School has a rich horticultural heritage from the man whose name it bears.



IN 1865 — BEAUTIFICATION  
AND SERVICE AT  
A VERY FAIR PRICE

“I agree to deliver and set out shade trees of cottonwood, of a reasonable size, at one dollar each. Any person wishing to purchase one can call at J.H. Voorhees’, or at H.T. Brendlinger’s store.” L.S. Records — April 10, 1865. Published in the Rocky Mountain News, April 10, 1938.

# NOW—

## After Many Years

KATHARINE B. CRISP

WHAT HAS HAPPENED to the trees planted by the pioneer who wanted to experiment? We are all aware of the difficulties that had to be overcome for their survival.

Today, some of the original trees planted still stand. Some of the try-outs survived only a short time, such as: the butternut, Russian apricot, sugar maple, Russian olive, and wild black cherry. These were reported by Mr. M. Walter Pesman as being alive in 1931 with one of the two butternuts in excellent condition. But they are gone now.

At present, however, there are some striking specimens which have survived since the early days, proving that certain trees, not native, can be grown in the Denver area. Illustrating this are the following facts (measurements were made in 1932 and 1966):

The bur oak, *Quercus macrocarpa*, is a handsome tree. In 1932 its diameter measured at 4 feet was 15.9 inches. In 1966 the measurement was 26 inches, an increase of approximately 10 inches in 34 years.

The sycamore or plane tree, *Platanus occidentalis*, of which there are several fine specimens, apparently grows more slowly than the bur oak. One tree, 75 feet tall in 1932, measured 21.6 inches in diameter. In 1966 the diameter was 28.3 inches, an increase of 6.7 inches. Two other sycamores showed an increase in diameter of 4.5 inches and 6 inches, respectively.

The horse chestnut, *Aesculus hippocastanum*, described as a "noble specimen," is an interesting forked tree with a shapely round top. In 1932 the diameter at 4 feet 6 inches was 10.8 inches. In 1966 it measured 21.9 inches, an increase of 11 inches.

Three American lindens in 1932 varied from 50 to 55 feet in height. One of these, 50 feet high, had a diameter of 17.8 inches in 1932. In 1966 the diameter is 24.8 inches, an increase in growth of 7 inches.

The honey locust, *Gleditsia triacanthos*, is now being planted in Denver as a desirable shade and street tree. The tallest in the Byers' collection measured 75 feet in height with a diameter of 19.1 inches in 1932. Now in 1966 the diameter is 29.2 inches, an increase of 10.1 inches.

The Kentucky coffee tree, *Gymnocladus dioica*, was 42 feet high in 1932 with a diameter of 9.2 inches. In 1966 the diameter is 11.1 inches, an increase of nearly 2 inches, showing very slow growth. There are finer specimens in Cheesman Park and City Park.

Although these measurements are somewhat limited, they do suggest what one may expect in the rate of growth of a tree. It does take time.

It is interesting to note how the Russian mulberry, *Morus alba tararica*, has persisted in shrub-like form in several spots on the grounds.



The "Perfect Tree" — Boulder Canyon Epitomizing What Horticulturists Strive For: Beauty and Perfection.

RALPH R. HILL

# A S P E N



## Colorado's Most Valuable Tree?

IS IT HERESY to say that our state tree — the Colorado blue spruce — is outranked by the aspen?

Take the aspen in the photograph. Carved into its bark in nature's language are these happenings from top to bottom:

1. The nest of a woodpecker — the forest's sanitation engineer.
2. The claw and tooth marks of a hungry or inquisitive bear that

chewed into the nest of hungry young birds.

3. The marks of incisors where elk have fed on tasty aspen bark.
4. A beaver's characteristic chisel marks where he started his initial undercut.
5. The blackened scar where mice fed on its bark under the protection of winter snow.

All of these uses of aspen by wildlife are common occurrences, but are seldom so completely spelled out in a single tree. We can be sure that in its younger life some of this tree's buds fed grouse in winter, and its nutritious twigs and leaves were browsed by deer and elk.

But these are only a small part of the aspen's place in conservation. Characteristically, aspen is one of the first trees to take over burned areas, provide soil cover, and restore soil fertility. Its ability to sprout from shallow roots lets it grow in eroded gullies where it is one of nature's best soil stabilizers. Its inter-connected root system lets it spread into tough sites where independent seedlings could not survive.

The temperature of trout streams is kept cool by aspen shade, and trout rise to the insects falling from its crowns. Its roots keep the streambanks from washing away in times of high water. Its fallen leaves provide organic matter for aquatic insects. And without aspen many small streams would lack the beaver ponds where trout grow rapidly to bragging size.

Why do climbers, hikers and hunters find deer and elk in aspen pockets? Because in the shade of these trees, and in the rich soil of aspen stands grow the most preferred summer-autumn wild forage plants in Colorado.

In the fall, the Colorado Mountain Club schedule fills up with hikes to enjoy the beauty of aspen colors. Year around aspen offers counter-point color to the pine-clad mountain slopes.

Aspen has commercial uses, too —

matches, excelsior and plywood or panel stock of exceptionally soft beauty. For clean campfires, dry aspen has long been a woodsman's favorite. Many a raging forest fire in spruce and pine has been stopped when it reached a relatively cool, moist aspen stand.

Some folks point out that aspen uses more moisture than conifer or grasses, and that streamflows might be increased by getting rid of it. Others would like to favor aspen over such better lumber trees as pine and spruce. Some see more value in grass range for cattle.

Is aspen in danger? Certainly not from logging, because cutting stimulates prolific sprouting. Some foresters might favor spraying it in local areas to release spray-resistant, under-story confers. Some areas might be sprayed to encourage range grasses for livestock. And some water users have seriously considered killing aspen, particularly along stream sides, to increase water yields. Where aspen may really suffer is along the streams where its benefits to wildlife are greatest. Here cattle tend to concentrate and often browse sprouts of beaver-cut trees until the aspen disappears. Cattle, as well as elk, relish aspen.

Still, to my way of thinking, aspen is the most important tree in Colorado. This is not to say we should do away with all but aspen, or that we should designate it the state tree in lieu of Colorado blue spruce. But when the scales are balanced, what other tree can show so many values in our forests?

Reprinted from *Trail and Timberline*





# Fall Color in the Garden

WITH THE ONSLAUGHT of new and improved varieties of annuals and perennials, the summer array of color that makes our gardens comprehensible, vibrant and magnificent for us is not too difficult to accomplish. But it takes a little more care in planning to provide a continuing color pattern in the fall landscape. The same frost that brings the yellow, copper and red tones to our leafy hillsides brings a sudden end to the late burst of colorful profusion in the garden. A garden that may have been a thing of beauty during the spring and summer may be a veritable failure in the fall, at the very time that nature is "letting itself go" in burgeoning beauty all around us.

Those of us whose business it is to plan parks and gardens for the enjoyment of others make a special effort to work fall color into our plantings. Too much attention cannot be given to obtaining year 'round effects. Shrubs for landscape plantings are too often chosen solely on the merits of their flowers, whose display is generally of short duration. However, each plant remains as part of the landscape picture all year long. Unless it can be admired at other seasons, too, its role in the garden scene is a minor one.

EDMUND WALLACE  
Planning and Engineering  
Director Denver Parks  
and Recreation

Forsythia and lilac, for example, are cherished when in flower and we are tempted to fill our shrub borders with their splendor but, after the bloom is gone, these shrubs are relatively uninteresting. This is not to say that shrubs like these should not be planted but, rather, that they should be sparingly used, especially in small gardens. Preference might better be given to plants with evergreen foliage, autumn coloring, ornamental fruits, even distinctive bark or branching habits, as well as to attractive flowers.

The dogwood, in the fall, is covered with whitening clusters of attractive and persistent berries. Most common of the dogwoods is the redosier with cream-colored berries, but equally valuable are the Gray's dogwood with white berries and the Bailey's dogwood with blue berries. (This species is hardy in this section.)

The mountainash attracts us as well

as the birds with its large clusters of bright orange fruit in the fall. The pyracantha, or firethorn, as it is commonly called because of its bright, fiery color, adds a brilliant accent to the garden when it is most needed. The cotoneasters produce berries which will remain until the ice and snow come. There are at least two quite hardy cotoneasters which give good winter effect with their berries. The Peking has black berries and the European, bright red. Birds do not seem to eat these berries until late spring.

Most of the crabapples do not hold their fruit long, but many are very attractive for a few weeks or months. The dolga is one of the most appreciated; it is covered with white blossoms in May and is just loaded with brilliant red fruit in the fall.

The attractive seed heads of the Rocky Mountain sumac begin to "color up" in August. When frost comes, the foliage will be brilliant in hues of red and orange that remind one of the brilliance of the eastern maples. Remember, however, to contain these shrub roots or they will run over into other plantings.

The viburnums and hawthorns are important for fall foliage variety. The highbush cranberry has long-lasting red berries; the nannyberry and arrowwood have blue-black fruits and the wayfaring tree has fruits which change in color from green, through yellow and red, to black. The other good characteristics of this group of shrubs make them very desirable. The hawthorns have a great



variety in the color, character and season of their fruits. Some, like the cockspur, bear fruit that hangs on all winter but is rather dull in its color; others, like the downy, have large, bright red fruit, but this only hangs on a few weeks in the fall. The native "haws" have rather attractive red fruits which are quite persistent. Probably the best "haw" is the Washington, bearing bright red fruit, which hangs on most of the winter, looking much like holly berries.

Among the vines, bittersweet leads when it takes a notion to produce fruit; the fluffy seed heads of clematis are very attractive, though not colorful, and, for a short season, the fruits of Engelmann ivy and hop vine are very pleasing.

Include some of these plants with attractive fruits in your yard and you will extend the time of interest in your garden by many weeks. As for trees, the male cottonwood, if your yard is large enough to accommodate it, will give you the same golden hues as the aspen, as will the white birch, green ash, honey locust and numerous others that might be better sized for your garden.

For the easterner, who misses the reds he enjoyed back home, the Norway maple, red oak, amur maple and taller sumacs might help to fill the void. The oaks and hard maples are a little choosy as to soils and it would be best to follow the advice of your





nurseryman or landscape architect about planting these beauties.

Shrubs offer the best possibility for reds and bronzes and should be carefully selected for the fall garden. Especially colorful is the redleaf Japanese barberry, which also has bright red fruits.

The euonymus group is one of the most important. The European euonymus and the wahoo have rich fall color. The euonymus alatus is blood red and always to be watched as to its location in the garden, for it can either "make" a fall scene or create a most unpleasant discord with other reds. Scarlet and crimson may spoil each other if not separated by large masses of green and yellow. The more intense a color, the less mass of it is needed. That is one reason why strong scarlets and crimsons had better be used in small groups close to the lawn, whereas yellows look particularly well at a greater distance, especially when seen against the blue sky.

Fall color should be scattered through a planting in apparently haphazard fashion although in reality it must be carefully thought out with high spots of color in important places. Color, in other words, should carry the eye to the focal areas where the garden is particularly lovely.

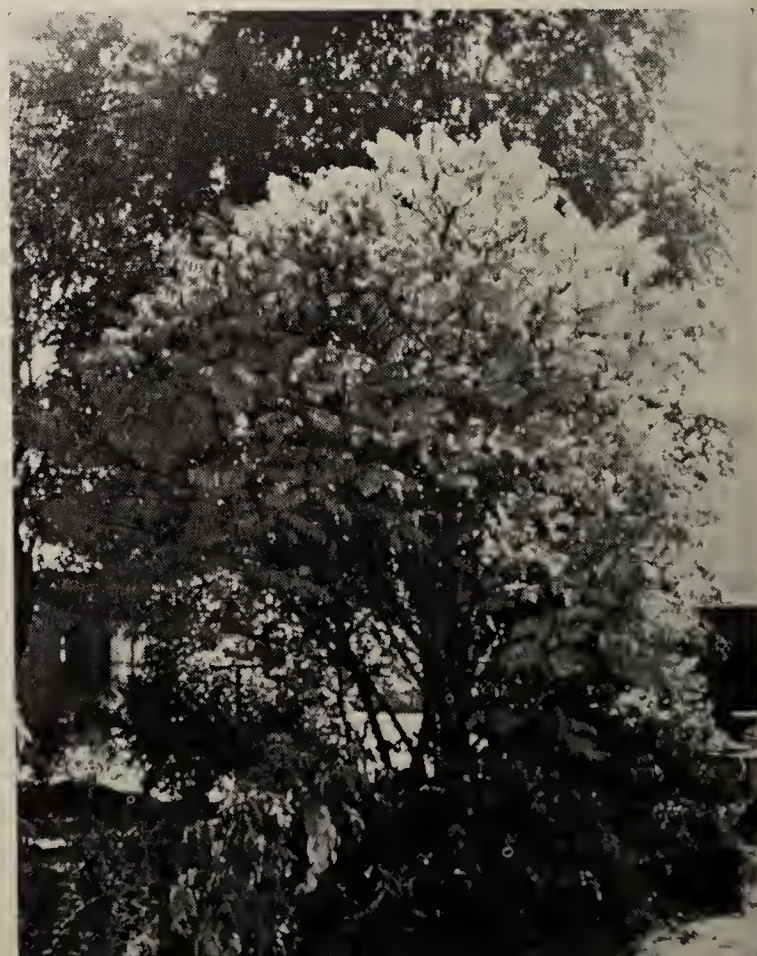
Colorful, but more subtle, are the currants, spireas, viburnums and ninebarks. The dwarf variety probably has the best hue. The western sandcherry,

the purple leaf plum, the Austrian copper and prairie roses, the bridal wreath and garland spireas, the nannyberry, blackhaw and American cranberry bush viburnums are among the best in their respective varieties for fall color.

In arranging one's planting, one must remember that even the most gorgeous color can be surfeiting if it fails to have a foil. Thus, aspen color is most photogenic when it is contrasted with dark green evergreens. The mind reacts to change and becomes weary of sameness even though that sameness is spectacular to begin with.

So, in the fall garden planning, be sure to have some good greens to bring out the crimson and the gold. Common lilac keeps its green leaves a long time, as does buckthorn. In spite of the best laid plans, you may find that discords have slipped into your garden. Take time this fall to make a mental note for a better placement and put it on your schedule for next spring. The best all-year garden comes often by trial and error. Do not be discouraged if your garden needs a little rearranging occasionally to get the effect you want.

Fall should be a climax of pleasant color that will take us through the winter.



More on . . .

## Exotics of Colorado

ROY E. WOODMAN  
Landscape Service (*Retired*)  
1251 South Williams Street  
Denver, Colorado

Dr. Helen Marsh Zeiner  
c/o Denver Botanic Gardens  
909 York Street  
Denver, Colorado

Dear Dr. Zeiner:

Referring to your article in *The Green Thumb*, March-April 1966 issue, subject: redbud tree.

Your article made very enjoyable reading for me, particularly because it creates new interest in some of the exotics that can be successfully grown in Colorado.

You may know about another redbud that, I am pretty sure is the largest in the state, located on the home grounds of Mr. Ben K. Lantz, 1020 South Franklin Street, facing Washington Park.

In the early 1920's I did some experimenting with redbud and a number of other exotics, and planted this tree for Mr. Lantz who, incidentally, was a schoolmate of mine in the Denver Public Schools. Out of ten small trees planted in our nursery and a few on private home grounds, this tree is the only one that survived.

It is now about 12 inches in diameter

and has never frozen back in winter as far as I know. Naturally, it is the pride and joy of Mr. Lantz as he realizes that he has a prize which attracts a lot of attention.

The City Parks Department is rapidly becoming interested in exotic plant material of various kinds, and I suggested that they use the facilities of the City Park Greenhouses and the knowledge of Mr. Mike Ulaski (Greenhouse Superintendent), whom I have known for many years, to do the propagating.

This they are doing, and I was able to get Mr. Lantz to allow them to take cuttings from his redbud, under the supervision of Mr. Ulaski, who has the cuttings and is now in the first process of making tree stock. Both he and I have great hopes that this tree, being so well acclimated, will produce new trees with the same hardy characteristics. The stock could be used to beautify our parks, gardens and other areas.

Incidentally, there is another beautiful exotic from which I was able to persuade the owner to allow cuttings to be taken in the same manner as with the redbud.

This tree is a copper beech growing on the grounds of Mr. and Mrs.

Rudolph Fox, 1333 East 3rd Avenue. The story about this tree is as follows: About 1912 or 1913, I was with the Park Floral Company, then located at East Colfax Avenue and York Street, in the capacity of Landscape Superintendent.

The father of Mrs. Fox, a doctor by profession, remembering the beauty of copper beeches at his home in the east, decided that he would like to try to grow one at his new home in Denver and ordered it from the Park Floral Co. Three or four one-inch trees were shipped from an eastern nursery, balled and burlapped, and one was planted for the doctor, as I remember, on the parking area in the 1700 block of Gaylord Street on the east side of the street. I supervised the complete care of this tree until it had reached a diameter of about six inches. The doctor passed away and the tree became the property of Mrs. Fox.

Mrs. Fox was interested in transplanting it to her home at 1333 East

3rd Avenue. I thought it had a good chance for survival and did move it with a seven-foot diameter ball of earth (which, incidentally, was quite a chore in those days of no mechanical equipment, just manpower, teams, and low-bed stone wagons. The tree thrived in its new location and again, by this time established in my own business, it was up to me to supervise the care of the tree until I retired in December 1959.

The tree is now 12 or 14 inches in diameter, a beautiful specimen, undoubtedly the largest in Colorado. I would be interested to know if there is another copper beech in Colorado.

We have hopes that the cuttings which Mr. Ulaski is propagating will be hardy and that, at some later date, this beautiful tree will be a welcome addition to the landscape in our beautiful state.

Respectfully,  
 Roy E. Woodman, *(Retired)*  
 Builder of Beautiful Gardens  
 and Landscapes

----- CUT HERE -----

**DENVER BOTANIC GARDENS**  
 909 York St., Denver 6, Colo.

I hereby apply for membership in the Denver Botanic Gardens   
 I wish my membership in the Denver Botanic Gardens extended   
 Enclosed is \$..... for my annual dues.

Class of Membership desired: (check one)

<input type="checkbox"/> Regular .....	\$ 5.00	<input type="checkbox"/> Supporting .....	\$25.00
<input type="checkbox"/> Participating .....	\$10.00	<input type="checkbox"/> Contributing .....	\$50.00
<input type="checkbox"/> Sustaining .....	\$100.00		

Name.....		
Address.....		
City	Zone	State

# Chrysanthemums —

## Autumn's Treasure

CHRYSANTHEMUMS, inexpensive, rewarding perennials, are hardy, bloom over a long period of time and need little care. Requirements are plenty of food, water and sunshine. A little protection in winter is beneficial if non-hardy varieties have been planted. Leaving the stalks uncut during the winter months is usually sufficient.

Chrysanthemums need to be transplanted every one or two years (I prefer transplanting every year). As early as possible before May 1, I lift the old plant and carefully take the new plants that are formed on the outside, discarding the center. Bed the new plants in rich, loamy soil about 1½ to 2 feet apart and water them in well. When the plants are about four weeks old, apply fertilizer rich in phosphate, such as 5-10-5 or 7-6-5. When the plants are about 6 to 8 inches in height, pinch them back half-way (this encourages them to become bushy). If you wish, plant the pinched-off tops in either soil or sand, keep moist and covered with a flower pot for a few weeks, and you will have new plants.

Another good feature of this perennial is that it transplants easily. Should vacancies occur in a border toward the end of summer and you have extra chrysanthemums tucked back in the garden, use them for these vacancies. Simply take plenty of soil with the plant, water in well, and the plant will hardly know it has been moved.

Chrysanthemums in this area are quite free from disease. As a precaution, don't keep plants soggy, give them

plenty of room, water early in the day, and keep branches off the ground by staking.

Chrysanthemums are available in many varieties and types with variations both in size and shape of plant as well as in size, shape and color of flower. Their range is from short cushions at 8 inches to intermediate and tall at 2 to 3 feet. Cushion types usually bloom early in the summer, by mid-July, and, with careful planning, the chrysanthemum season continues until heavy frosts and snows take their toll. Types include single, pompon, decorative (the petals usually incurved), spoon, spider and quill. Many colors are available in shades of white, yellow, pink, lavender, red and bronze.

Not all chrysanthemums do well in this region. Dr. A. C. Hildreth, while Director of the Cheyenne Horticultural Field Station, pioneered in research and development of many excellent varieties that produce abundant blossoms, bloom early and are adapted to our unusual winters. Mr. Gene Howard continues this work at Cheyenne.

Professor Homer Metcalf, while at Montana State University at Bozeman, produced other outstanding hardy varieties. Extending the development of Cheyenne's U.S.D.A. introductions, Professor Glenn Viehmeyer, of the University of Nebraska, has produced the large, spectacular chrysanthemums known commercially as "Space Age." These are garden equivalents of greenhouse "football mums."

Following is a list of Chrysanthem-

mums that have been grown successfully in the Denver area during recent years and have given consistently good

results. Where possible, the date of first bloom and origin of plant are included.

#### U.S.D.A. INTRODUCTIONS:

'Arikara'	Bronze	14"	Mid-Aug.
'Bridger'	Lav.-Pink	12"	Mid-July
'Buffalo'	Lt. Bronze	10"	Mid-July
'Gold Alabaster'	Yellow	24"	Mid-Aug.
'Hoback'	Deep Lav.	18"	Early Aug.
'Inca'*	Yellow-Bronze	24"	Early Aug.
'Red Chief'	Dk. Blood Red	24"	Late Sept.
'Red Desert'*	Red	16"	Early Sept.
'Red Warrior'	Strawberry Red	18"	Mid-Aug.
'Seminoe'	Lt. Lav.	18"	Mid-Sept.
'Togwotee'	Red	18"	Late Sept.

#### OTHER GOOD VARIETIES:

'Alabaster'	White	24"	Early Aug.
'Dr. Langley'	Rose-Pink	18"	Early Sept.
'Early Gold'	Yellow	15"	Mid-Aug.
'Gladness'*	Pink	15"	Late July
'Gold Standard'	Yellow	24"	Late Aug.
'Lipstick'	Red	18"	Mid-Sept.
'Little Sandy'	Small Red (Yellow Center)	18"	Early Aug.
'Malinda Brown'*	Lavender	22"	Early Sept.
'Red Togwotee'	Red - Carnation type	18"	Early Sept.
'Ruby Mound'	Red Cushion	15"	Mid-Sept.
'H. Sutcliff'	Yellow	24"	Late Sept.
'Adorable'	Pale Pink	14"	Late July
'Nanook'	White	14"	Mid-Aug.
'Geo. Luxton'	Bronze	24"	Mid-Sept.
'Tasiva'	White	16"	Late Aug.

\*Outstanding.

Montana State University introductions include: 'Montaska' (bright purple) and 'Sleeping Child' (rose pink) both of which bloom here in late August and are excellent. Other introductions which I am unable to report on at this time include 'Blackfoot' (red button), 24", 'Custer' (apricot), 'Kimbyoyu' (yellow), 15"; 'Mountain Sun-

set' (red), 24", and 'Silver Rim' (white), 24".

Although several varieties of Professor Viehmeyer's introductions are available, my only experience is with 'Prairie Dawn' (Lavender-pink), 18". A cushion type with 3" blossoms which blooms in early August. Its performance rates excellent.

Hope You Were There

# 1966 TERRACE AND GARDEN TOUR

MARCIA MACDOUGALL

**N**EARLY 550 persons joined the parade for the Terrace and Garden Tour on August 3, 1966. They toured nine of the Denver area's most interesting gardens which were groomed to perfection and displayed their best appeal on a beautiful August day. The hosts, who so graciously allowed their gardens to be opened to the public for the benefit of Denver Botanic Gardens, were:

Mr. and Mrs. William H. Lucking, Mr. and Mrs. Winston S. Howard, Mr. and Mrs. Holbrook Mahn, Mr. and Mrs. John M. King, Mr. and Mrs. G. Harold Sare, Dr. and Mrs. John Grow, Mr. and Mrs. Robert W. Blanchard, Mr. and Mrs. Stanley T. Wallbank and Mr. and Mrs. Homer E. Reed.

The members of Denver Botanic Gardens Guild began preparations for this major event many months ago, and the careful attention that was given to all important details was evidenced by the smooth manner in which the Tour was conducted.

Mrs. Earle Honnen and Mrs. William E. Russell selected the gardens for their design, plant materials and outstanding features, doing an excellent job. These well-designed gardens included a stylized Japanese garden; a contemporary garden surrounding a lovely, large patio; a formal English garden; an informal garden with waterfalls cascading into a lily pond and an outstanding semi-circular rock garden.

Visitors were impressed by the se-

lection and use of a wide range of plant materials for both sunny and shaded areas. Plant experts volunteered their services, as in the past, to identify unusual specimens and to explain proper culture for the colorful annuals and perennials, roses, ground covers, espaliered fruit trees, and the large variety of ornamental trees and shrubs. Many guests came simply to admire but others gleaned helpful information for use in their own gardens from the following people who generously shared their horticultural knowledge:

Mr. Scott Wilmore, Wilmore Nurseries; Dr. A. C. Hildreth, Denver Botanic Gardens; Mr. Kenneth Wilmore, Green Bowers Nurseries; Mr. Guy Fox, Men's Garden Clubs of Colorado; Mrs. Raymond Turnure, The Denver Rose Society; Mrs. Herb Fran-son, Associates of Denver Botanic Gardens; Mr. Russell Weiss, Mr. Jerry Morris, Mr. Gilbert Hall, Marshall Nurseries; Mr. Earl Sinnamon, Swingle Tree Surgeons, Inc.; Mrs. Walter Ash, Associates of Denver Botanic Gardens; Mrs. Persis Owen, Herb Garden expert; Mr. William Lucking, Rock Garden specialist; and Mr. Stanley Wallbank.

Bus tours to the gardens left Botanic Gardens House at 10:00 a.m. and 1:00 p.m., providing a service for out-of-town visitors and those who preferred to sit back and let some one else do the driving. A hostess staffed each of

the four busses to help orientate neophytes on the details of the tour.

Denver Botanic Gardens are indebted to the more than forty volunteers who worked so enthusiastically for the success of the Terrace and Garden Tour under the capable direction of the following members of the Guild who served as chairmen of the various committees:

Mrs. Richard Wilson, Mrs. James Kilgroe, Mrs. James Dyer, Mrs. David Stone, Mrs. Loring Brock, Mrs. Theodore Washburne and Mrs. Thomas Payne.

The Garden Club of Denver again supported the efforts of the Guild and we extend a cordial invitation to other garden clubs in the area to participate in this fun-filled educational event.

# HIGH COUNTRY NAMES

LOUISA WARD ARPS

ELINOR EPPICH KINGERY

Smile! You live in Tahosa.

Who, me?

Well, you don't. You live in Colorado. But Tahosa was considered as a state name for the colorful, scenic area we all know as Colorado.

History makes names but names also make history. Describing the history and origin of the names in Rocky Mountain National Park and the Indian Peaks country, Louisa Ward Arps and Elinor Eppich Kingery have brought 100 years of Colorado history to life in their book, "High Country Names," recently published by The Colorado Mountain Club. The endurance, the rough and ready justice, and often the bravery of the explorers, miners and settlers are made as fresh as if they had happened yesterday.

The authors are both of Colorado pioneer stock. They have climbed extensively in the Rockies and have summited on the North St. Vrain and at Grand Lake, where they have collected the history of place names for years. Louisa Ward Arps was a librarian in both the Western History De-

partment of the Denver Public Library and at the State Historical Society of Colorado. Her series of TV programs on Denver history, sponsored by the Denver Public Library, resulted in her book called "Denver in Slices." The Colorado Mountain Club published her "Front Range Panorama," a graphic presentation of the Front Range mountains as seen from Denver. Elinor Eppich Kingery served as secretary of The Colorado Mountain Club, edited its magazine *Trail and Timberline*, and compiled the first climber's guide to the Colorado high peaks. Recently, for the State Historical Society of Colorado, she has been tape-recording interviews with colorful Colorado characters.

The book, "High Country Names," may be ordered from Denver Botanic Gardens Gift Shop or from The Colorado Mountain Club, 1400 Josephine Street, Denver, Colorado 80206.

There will be a review of this interesting book by Mrs. Emma Barnard in the next issue of *The Green Thumb* magazine.

# DENVER BOTANIC GARDENS

*A Non-Profit Organization*

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SHOOTING STAR  
*Dodecatheon pauciflorum*

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## DENVER BOTANIC GARDENS

DENVER, COLORADO

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A botanic garden is a collection of growing plants, the primary purpose of which is the advancement and diffusion of botanical knowledge. This purpose may be accomplished in a number of different ways with the particular placing of emphasis on different departments of biological science.

The scientific and educational work of a botanical garden center around the one important and essential problem of maintaining a collection of living plants, both native and exotic, with the end purpose of acquisition and dissemination of botanical knowledge.

# *The Green Thumb*

NOVEMBER-DECEMBER 1966



THE COVER Christmas Wreath Designed by  
MRS. C. J. CHRISTENSEN, Gift Shop Workshop

## *THE GREEN THUMB*

VOLUME TWENTY-THREE, NUMBER SIX

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# The Green Thumb

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HELEN M. VINCENT, *Editor*

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By becoming a member of Denver Botanic Gardens, you will receive *THE GREEN THUMB* and the monthly *NEWSLETTER*. You will also have unlimited access to the use of the books in the Helen K. Fowler Library at Botanic Gardens House.

For further information write to the Membership Chairman, Mrs. William Stanley, 3800 East Long Road, Littleton, Colorado 80120 or call 771-3617.

# Dr. Hildreth

## A Message of Appreciation

EDITORIAL COMMITTEE

DR. AUBREY C. HILDRETH was appointed Director of Denver Botanic Gardens in July of 1959. Shortly thereafter he became a most valued member of *The Green Thumb* Editorial Committee. Now, regretfully, the other members of this committee must accept the fact that he has retired as director, effective October 31, 1966.

We, who have enjoyed the privilege of knowing and working with Dr. Hildreth, feel that this short span of years was enriched for us by his presence and by his great knowledge of scientific progress to which he has contributed so much through his own research efforts. He has generously shared his learning with those who sought his help. The members of the Editorial Committee particularly appreciate his assistance, guidance and contributions to *The Green Thumb* magazine. His gardening tips in the monthly *Newsletter* have provided vital information to the members of Denver Botanic Gardens and his scholarly articles on

plants and gardening in the Rocky Mountain News have added to the horticultural knowledge of the community.

The numerous other phases of his diversified career have been recorded many times in other news media. We can add nothing to these accounts excepting to applaud all of the well-deserved encomiums.

This is a message of warm and sincere gratitude to Dr. Hildreth for the years he has shared with us. His priceless sense of humor and sly wit have often lifted our morale when the going was heavy. We wish him a future filled with as much enthusiasm and variety of botanical pursuits as the past has provided. We are grateful that he remains with us as Director Emeritus for this gives us the feeling of assurance that he will still be available to help us with some of the many problems which arise in publishing a magazine devoted to the dissemination of gardening knowledge in the Denver area.

# More Weal Than Woe



## IN WINTER

M. WALTER PESMAN

IF YOU THINK that wintertime in the Rocky Mountain region is akin to that of the polar area, with blustery winds and sunless snowy wastes, low-hanging clouds and inaccessible crags hidden from civilization — then, you just don't know your Rockies. Actually, for many people, winter is the most glorious season of all the year to see the mountains. It offers breath-taking, sunny days when the deep blue of the sky combines with the glistening white of high mountain tops to create an unforgettable panorama of majestic outline.

You may be walking along, the snow squeaking underfoot, feeling "tops" and at peace with the world — enjoying life to the full — when somebody mentions that the mercury is hovering around five to ten degrees below zero. However, the sun's warm rays contradict the thermometer so, giving the duly expected shiver, you continue on in the same happy mood — what of it?

The snowy slopes beckon to the ski enthusiast to pursue his exhilarating sport amidst scenes of grandeur and even the more staid nature lover will find good outdoors enjoyment stored away in the winter in the Rockies.



Rocky mountain red cedar  
(*Juniperus scopulorum*).



Twig with berries and scale-like leaves.

I have just returned from a winter afternoon visit to the mountains. There was no special excitement, no hair-raising narrow escapes on icy highways, no rocking back and forth of a marooned car, with wheels spinning in the snow until the driver learned to take it easy in high gear. No excitement? Oh, yes — the stimulating excitement seen in the silhouette of the narrowleaf cottonwood against the blue sky, the glistening dark branches of chokecherries and the patches of snow playing hide-and-seek among the Douglas firs. We saw the red berries among the kinnick-kinnick leaves, the waxy Juniper berries crowded on the south side of the Colorado “cedar,” *Juniperus scopulorum*, and the bronze-green leaves of Oregon grape hugging the ground on south slopes. These are never-failing delights.

We were impressed by the tall vertical stalks of mullein, now brown, having lost their gray, woolly, summer appearance. Some are branched, with two or three fingers, reminding one of the picturesque saguaro cactus of Arizona. Less compact is the old stalk of showy *Frasera*, also called green gentian, turretplant, elkwood or deer-



Oregon grape (*Berberis aquifolium*)

tongue; it still shows numerous seed-pods.

Silhouetted in sunlight, a lower seed-stalk looks as if clothed in hoarfrost — it is miner’s candle. Yarrow retains in winter both its characteristic flat head and its pungent odor. Sulphur flower, as well, has a flat head, more of a brownish tint and lacks the finely divided leaf of yarrow along the stem. It has, instead, a neat rosette of leaves at the bottom of its flower stalk.

Papery-thin pods of mariposa lilies are in three parts, penstemon pods come in fours and evening-star flowers have neat, upright, cylindrical pods with a top opening. The boldly-modeled seed-stalk of soapweed is easily recognized in both plains and foothills.

These, then, are just a few examples of the way to recognize common wild flowers even in midwinter. The better you know them in the growing season, the more easily you will recognize them later.



Mountain mahogany. (a) (*Cercocarpus intricatus*). (b) (*Cercocarpus parvifolius*)

This holds true for trees and shrubs, too. In addition, there are certain “give-away” pointers that help in identification. Professor B. O. Longyear used to irk me as a student by his slow, deliberate investigation when asked to identify a plant. He would investigate the buds, look for dried-up fruit, a remnant of a leaf, he might whip out his pocket hand lens — and finally produce the substantiated evidence while pronouncing the name of the plant.

Here are a few examples of such specific evidence: in the foothills a shrub is puzzling you. Is it mountain mahogany? Threeleaf sumac? Antelope brush? Service berry?

Break a twig and smell the fresh wood. Threeleaf sumac is also called skunkbush and there is the cue. Once you have smelled the wood, you will never again doubt this plant’s identity. There is just no other shrub which smells like it! In the east, some have had the gall to call it “lemonade sumac!” So much for the skunkbush.

If a plant does not have a characteristic smell, look for other specific evidence. A mountain mahogany is very apt to have, hidden somewhere among the branches, one of its corkscrew, featherlike “fruits” (as botanists call them). If one of them is found attached

to the top branches, there is no need to look further, except, perhaps, to make doubly sure by discovering its gray, toothed leaf.

Antelope brush is almost sure to carry some three-pointed, tiny leaves even in mid-winter. Service berry may have a few dried-up blue berries left and perhaps a round leaf or two, different from any other shrub.

Taste is important in this “recognition test.” For proper initiation into winter plant lore, chew the bark of chokecherry; discover the reason why a certain unsightly plant, with clusters of brown burs which stick to your clothes, is called wild licorice (taste its root). Under proper guidance you might learn to recognize *Osmorhiza* (sweet cicely) by tasting its pungent seed.

Afraid of poison? You might well be if you insist on tasting everything and in large quantities. Be selective and just nibble and taste — don’t attempt a full repast.



Plum-leaved Shad  
(*Amelanchier prunifolia*)



Common Shad  
(*Amelanchier spicata*)



# Butterfly Display

## in Conservatory



BERNICE R. JAE

ON DISPLAY in the Denver Botanic Gardens Conservatory is the Butterfly and Insect Collection of the Raymond J. Jae family of 1286 South Umatilla Street, Denver, Colorado. The idea of associating an insect display with the plants grown at Denver Botanic Gardens was purely an accident of circumstances. A week prior to Mr. Jae's first visit to Denver Botanic Gardens he had written to a friend for ideas regarding the disposition of his large collection, either by letting it go to some newly-established museum in a young foreign country or possibly displaying it through the new Disneyland venture in Florida. When Mr. Ernest Bibee offered the wallspace between the new conservatory and the greenhouses as a possible display area, Mr. Jae eagerly accepted the invitation to display the collection for the very first time, for it meant the realization of his fondest dream at last.

At the age of 12 Mr. Jae was collecting wild silkmoths to use as curtain tie-backs. His interest in collecting expanded and he began to acquire other specimens in and about Milwaukee,

Wisconsin. At the edge of 14 he had flown to Panama with his parents where he collected for 9 months after school hours and on weekends. Some of the large metallic-blue (Morpho) butterflies on display now were taken there by means of baiting with stale beer and rotten bananas. He enlisted in the Army Medical Corps and spent three Christmases in Kyushu, the Florida of Japan. After his discharge, he returned to Milwaukee State Teachers College where he entertained hopes of becoming a teacher. After a soccer injury, and with the looming possibility of collecting the largest Swallowtail in the Western Hemisphere, he abruptly left school and traveled to Florida from where he made two trips to Cuba, collecting wherever he went as is his habit to this day.

In 1949 he acquired the Strecker Collection from the Chicago Field Museum and this is the basis for the cases now on display at the Denver Botanic Gardens. There are 11 cases displayed on the wall in the Conservatory corridor with the possibility that another 60 cases will be similarly displayed in

the near future. Other than his own personal collecting, the majority of the specimens were obtained by exchanges and only quite recently has Mr. Jae turned to purchasing some of the rarer or choice specimens. Very few of the Strecker specimens were kept by Mr. Jae. Only those not already represented in his own collection were retained. In 1954 Mr. Jae moved to Denver with his wife, young family, butterflies and insects.

An enormous amount of world-wide correspondence and exchange goes on today. He has exchanged with the British Museum of Natural History, the Hague in Denmark, the South Australian Museum, the Royal Library of Copenhagen, the Milwaukee Public Museum and the Smithsonian Institute. One of the outstanding personalities he has traded with is Sergei Krushchev, the former Russian Premier's son. Mr. Jae would like to maintain a "living" collection, one in which materials would constantly be re-stocked and replaced. A rough estimate of the specimens contained in Mr. Jae's collection is in the neighborhood of 120,000. All of the United States and its possessions are represented in the collection and specimens from about 23 countries are still needed to make the world-wide representation complete. The difficulties in maintaining a large collection are in keeping out museum pests (known as dermestids), which eat through the bodies of the dried specimens, and in replacing the faded specimens (when, and if, possible). It should be noted here that males of certain species will very often be more common than the female. For example, we sorted through 377 butterflies and only found 2 females in the entire lot.

The collection involves over a quarter of a century of devoted effort by Mr. Jae and has invoked the additional participation of the family members as they grew up. In addition to the mounting and preparation of the specimens, it should be noted that each has a scientific label which specifies the date of capture, initials of the collector, where taken, and the scientific name of the specimen (when known).

On Sunday, August 14, 1966, some 2,000 people went through the conservatory which shows that a great many people took the time to pass by the display as they enjoyed their tour of the Gardens. We hope to make the display even more educational and interesting for the many school children who will visit Denver Botanic Gardens during the school year. It is natural to associate insects with flowers and it is our hope that we may enhance your visit to Denver Botanic Gardens by means of our display, thereby making your visit all the more meaningful to you. The collection is not on permanent display but Denver Botanic Gardens can be certain that it will be available to them for at least a few more years.



# HIGH COUNTRY NAMES

LONGSTEA  
ARAPAHO  
ONEEAGLE

A Review by MRS. EMMA RIGGS BARNARD

COLORADO'S FIRST botanist visitor in the high country was Dr. Edwin James in 1920, when in early July he discovered the Colorado Columbine, *Aquilegia coerulea*, at an 8000-ft. altitude. Later he found it above timberline and he "wondered if their proximity to the sky had any relation to their color."

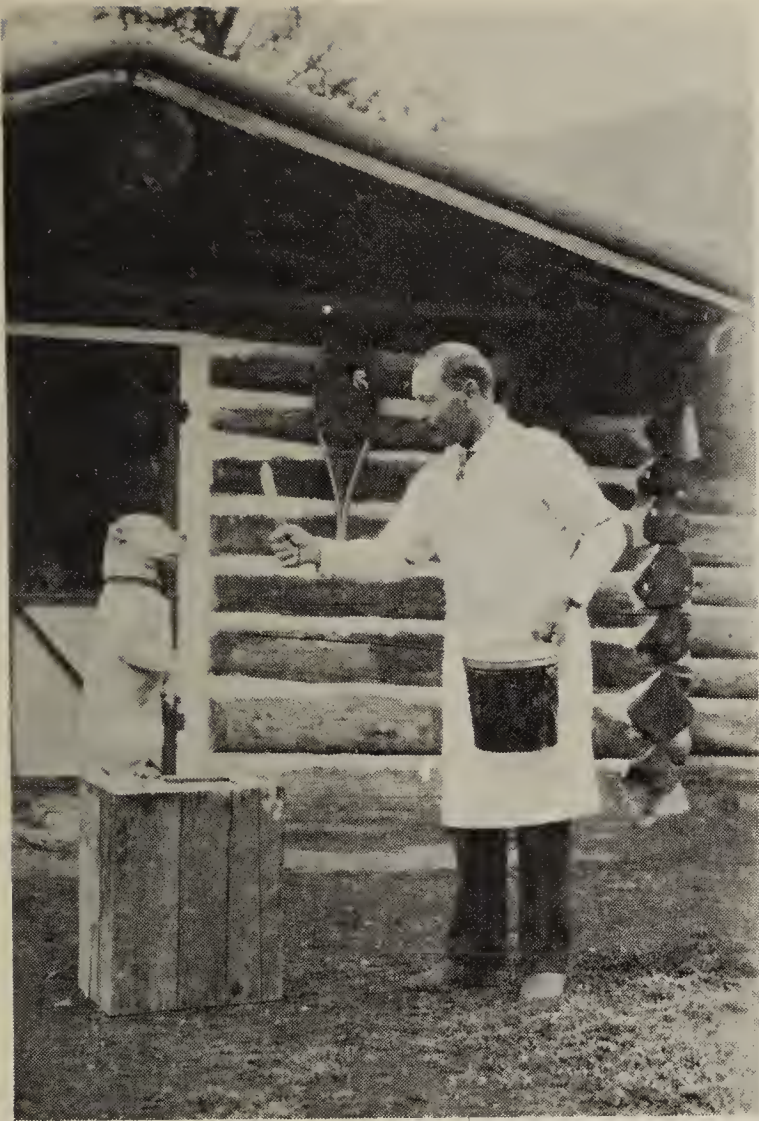
"In the Rocky Mountain Park, columbines have left their name on bays, creeks, falls, lakes, but not on a mountain. This seems a pity because the rare dwarf columbine, intense blue, sometimes rewards the exhausted climber on the very summit rocks." So say the authors of "High Country Names."

The purpose of the book is to furnish an authoritative record of the origins and history of place names appearing on today's most accurate maps of the Rocky Mountain National Park region. They have included nine maps and some thirty-five photographs. The authors call the book "a dictionary,"

but it is far more than that. The information they acquired during much research study and travel is given to us in brief articles in delightful conversational style, spiced with dry humor.

Their sources go back to the stories of early settlers, Indian lore, historians, scientists, mountaineers and explorers. They tell about colorful personalities from Lord Dunraven to Squeaky Bob. Estes Park was named by William Byers, editor of the Rocky Mountain News and quite a mountaineer, in an article published September 22, 1864, after he had spent a night in the home of Joel Estes, who settled there in 1859. The first person to map Wild Basin in detail was Dr. William S. Cooper, now living in Boulder after a distinguished career as head of the Botany Department of the University of Minnesota. He published his map in 1911 suggesting many names of which eleven were officially accepted.

One of the features that Dr. Cooper

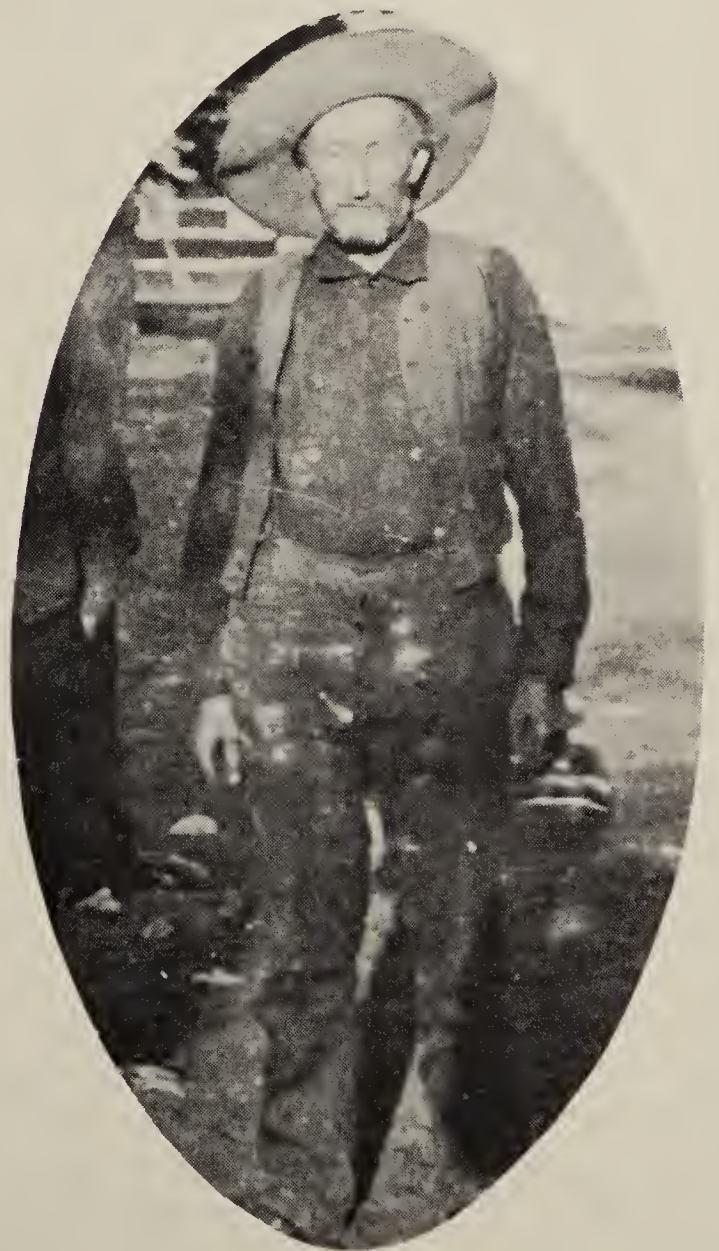


Squeaky Bob Wheeler

described was what he named "Meadow Mountain, a rounded hill covered with a most beautiful alpine meadow." A Chicago lady climbing elsewhere with the Colorado Mountain Club wrote, "we (walked) through seas of flowers of every hue imaginable. The blue gentians grew so thick that one swoop of the hand would have secured a large bunch, and they formed pools of blue, first on one side and then on the other of the road."

The fauna and flora of the Rocky Mountain National Park region have had an important part in the selection of names. Ptarmigan Mountain named as early as 1860 is one of a number of features bearing the name of this alpine grouse that changes the color of its plumage with the seasons and is probably the best known of our high tundra birds. Even the ubiquitous chipmunk, which, by the way, is a word that comes from two Ujibway Indian words, has at

least one lake named for him. The dense virgin forests in Black Canyon (which furnishes the water supply for Estes Park), and in Forest Canyon (visible from Trail Ridge) are striking in their mysterious beauty, and they also furnish sanctuary for much wild life. Another pre-historic spot is Paradise Park. "Without even a trail crossing its wilderness, Paradise Park — shows no marks of man. Ecologists think that the Engelmann spruce and alpine fir here form the climax of a forest which has developed without disturbances since the last glaciation. . . . A welter of fallen timber and rotting logs makes it virtually impassable. No elk and few deer venture through this jumble. Hikers traverse the park through soggy subalpine meadows and



Judge Joseph L. Westcott



1868 Sketch of Grand Lake

sphagnum bogs which, like the forest, represent a succession uninterrupted since the ice age.”

As should be expected, the references to flowers, bushes and trees, and even botanists, are connected with nomenclature of the region rather than ecology. Among flowers mentioned is the yellow pond lily which is “the common water lily of high mountain lakes, blooming from July to frost,” and has given its name to lakes, falls and a mountain. Dr. C. C. Parry found specimens of the *Nuphar polysepala* in 1864. He and the zoologist, Dr. J. W. Velie, who climbed together in this region, also named Mt. Audubon.

Funny things did happen when famous people visited in the simple homes in this early wilderness. Fresh eggs were hard to come by and Mrs. James, later of Elkhorn Lodge fame, faced the problem of providing the desired poached egg for Mr. Chapin’s breakfast (Mt. Chapin was named for him). Her one hen accommodated and every morning when Mr. Chapin went out leaving his window open the hen deposited an egg on his bed, which Mrs. James promptly and tidily appropriated. In 1923 when “Slim” Lindbergh tried to enter a \$1000 contest to land a plane on the slopes of St. Vrain

glacier he was refused because his plane was “a crate held together by baling wire.” When in 1927, after his remarkable flight to Paris, Col. Lindbergh came to Colorado he recalled the incident. But when Colorado wanted to name a mountain for him and an almost inaccessible peak was selected — “Towering above an ice-gouged abyss stands a granite shaft that points a solitary finger skyward” — it had to be named “Lone Eagle Peak,” because the U. S. Board of Geographic Names never names main geographic features for living people.

“High Country Names” is available at Denver Botanic Gardens Gift Shop in the Conservatory. Price \$4.95.

AUTHORS: LOUISA WARD ARPS *and*  
ELINOR EPPICH KINGERY



1913 Colorado Mountain Club  
Caravan in Stanley Steamers

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The Iris Book .....	Price	7.95
Iris, Goddess of the Garden.....	Ross	5.95
Let's Grow Lilies.....	Amer Lily Soc.	1.00
Native Orchids of Colorado.....	Long	1.25
New Book of Foliage Arrangements.....	Cyphers	4.95
New Complete Book of African Violets.....	Wilson	5.95
Picture Book of Annuals.....	Nehrling	5.95
Picture Book of Perennials.....	Nehrling	5.95
Pressed Flower Pictures and Citrus Skin Decorations.....	Booke	6.95
Readers Digest Complete Book of the Garden.....		9.95
Trees for American Gardens.....	Wyman	10.95
Western Forest Trees.....	Berry	1.50
What Tree Is This? .....	Barbour	.50
Wildlife of the Southern Rocky Mountains....	Yocum, Weber, Beidelman & Malick	2.95
Rose Issue of the Green Thumb Magazine.....		.50
*Meet the Natives		
*Flowering Plants of the Rocky Mountains.....	Nelson	
Complete Selection of Brooklyn Botanic Garden Handbooks.....		1.00 & 1.25
There are many other books available in addition to those listed here.		

\*Not yet off the press, but should be available before Christmas.

TO OUR FRIENDS:

MAY THE WARMTH

of

THE CHRISTMAS STORY

be

YOUR JOY

THROUGHOUT THE YEAR

From All Of Us at

DENVER BOTANIC GARDENS

Meet the

# "WHIMSICRITTERS"

POLLY STEELE *and* AVALONNE KOSANKE

"BEAUTIFUL! Are they real flowers?" asked a visitor to the Denver Botanic Gardens Gift Shop, located in the Boettcher Memorial Conservatory. The enthusiastic lady was holding up a bookmark featuring delicate pressed flowers. "Such lovely, natural colors. How do you do it? I would like to learn."

Yes, the visitor could learn how to make the bookmarks devised by Mrs. Graham Morrison, immediate past president of the Associates. Members find that working here at Denver Botanic Gardens is a two-way street, for here they are privileged to learn many skills and crafts while they work and share their talents in some chosen area of need. The Gift Shop is an area of many needs calling on the co-operative efforts of many Associates.

Bookkeeping knowledge is supplied this year by Mrs. Chard P. Smith, Jr., first president of the Associates, who also doubles as a buyer always on the lookout for new and unusual items to sell in the shop. Her bookwork is supplemented by the accounting proficiency of Mr. Charles M. Wilkins, C.P.A., whose expert hand steadies the financial tiller and ploughs the profits back into the Denver Botanic Gardens. Equally significant is the contribution made by Mrs. Charles V. Petersen.



Her knowledge and diplomacy transform untrained Associates into knowledgeable Gift Shop personnel. This staff, like all Associates, must be able to acquaint the public with Denver's newest cultural facility. The first Thursday of each month is circled by all Associates interested in the Craft Workshop, which is under the supervision of Mrs. J. V. Carroll. Here are taught the mechanics, techniques and principles of good design required to produce the many handmade items sold through the Gift Shop, items which lure the buyer in search of the unusual.

Featured on the cover of this issue of *The Green Thumb* is a handsome heritage wreath made by Mrs. C. J. Christensen in the series of wreath-making classes conducted by Mrs. E. R. Edison. Her students gathered bush-



els of pods, cones, acorns and other materials needed. Some wreaths are garnished with artificial fruit, while others depend exclusively on texture and subtle nuances of natural coloring to achieve the deeply satisfying quality of a good piece of sculpture. The workers were pleased to find their finished wreaths sturdy enough to withstand the rigors of shipping to out-of-state customers. In addition to these wreaths,

candle rings, place cards, plaques and other items are stockpiled from workshop meetings for the popular pre-Christmas sale each year.

The delightful figures capering across these pages are products of two imaginative women, Mrs. J. P. Steele, Jr.,



and Mrs. C. J. Christensen. These little "whimsicritters" scamper across the Gift Shop counter almost faster than the workers can make them. Customers find many of the items are unique and irreplaceable, for a special effort is made to feature local artisans' handwork. There are perceptive pen and ink draw-



ings by Guy E. Rogers, fresh pansies captured in jewelry by Hammond, wild flowers and watercolors by Joyce Thode, fanciful notes by Ravia, Aspen jewelry, Stained Glass paintings by the

Talbott's and original garden statuary by Ruff. Our roving buyers have brought back paperweights which stay the motion of flying milkweed or hold forever the delicate tracery of Queen Anne's Lace. Paintings and plaques from Suzy Ash reveal her love for native Colorado flowers. Ginkgo seed turtles from Japan, rosewood elephants from India, porcelain flower-print buttons from England, handmade creches from Poland mingle happily with locally produced items.

Flower arrangers have a heyday here. Tools, mechanical devices, aspen slices and camphor stands, accessories to please the buyer or tease the advanced arranger, and unusual candle holders tempt the beholder. Each item in this department is a selected favorite of Mrs. Robert Kosanke, National Council accredited Flower Show Judge.

Easy-on-the-budget basic containers rub shoulders with expensive, one-of-a-kind containers designed in Japan for Ikebana and advanced arrangers. Handsome Colorado originals make choice gifts for floral designs or *objets d'art*.

Books to give, books to collect and books for the student of botany make this Gift Shop tops for those in search of material on plants and related subjects. Mrs. Hayes W. Neil, book buyer, offers more than one hundred and twenty-five titles now and will gladly order books on other subjects for interested customers.

Yes, the visitor to the Denver Botanic Gardens may learn many things, may even discover the secret behind that infectious enthusiasm with which Associates go about their duties.

Associates of the "Gardens" work and learn  
The leaf that helps the tree grow, grows in turn.



# A Denver Botanic Gardens MEMBERSHIP *Makes the ideal Gift*

DENVER BOTANIC GARDENS, 909 York St., Denver, Colo. 80206

I hereby apply for membership in the Denver Botanic Gardens

I wish my membership in the Denver Botanic Gardens extended

Enclosed is \$..... for my annual dues.

Class of Membership desired: (check one)

- |  |          |   |         |
|--|----------|---|---------|
| <input type="checkbox"/> Regular .....       | \$ 5.00  | <input type="checkbox"/> Supporting .....   | \$25.00 |
| <input type="checkbox"/> Participating ..... | \$10.00  | <input type="checkbox"/> Contributing ..... | \$50.00 |
| <input type="checkbox"/> Sustaining .....    | \$100.00 |   |         |

Name .....

Address .....

.....  
City State Zip Code

----- CUT HERE -----

## ***Request for Membership Application*** **ASSOCIATES OF DENVER BOTANIC GARDENS** 909 York Street, Denver, Colorado 80206

DUES: NONE — REQUIREMENTS: Interest in and desire to aid programs of Denver Botanic Gardens

Name (Mr. Mrs. Miss) \_\_\_\_\_  
Check One

Address \_\_\_\_\_  
Street City Zip Code

Telephone \_\_\_\_\_ Date \_\_\_\_\_

Programs offered to volunteers include Annual Plant Sale, Maintenance, Membership, Promotion, Editorial Work, Education, Tour Guides and more. Complete this request for the regular Membership Application form *now*.

# Alphabetical List of Plants Now In Conservatory

ERNEST A. BIBEE, *Superintendent*

Botanical Name	Common Name	Origin	Family
<i>Acacia sphaerocephala</i>	<b>BULL-HORN ACACIA</b>	Trop. America	Leguminosae
<i>Acalypha hispida</i>	<b>CHENILLE PLANT</b>	E. Indies	Euphorbiaceae
<i>Achras zapota</i>	<b>CHEWING GUM TREE</b>	Cen. America	Sapotoceae
<i>Agave angustifolia marginata</i>	<b>VARIEGATED AGAVE</b>	Cen. America	Amaryllidaceae
<i>Agave potatorum</i>	<b>CENTURY PLANT</b>	Mexico	Amaryllidaceae
<i>Albizzia lebbek</i>	<b>WOMAN'S TONGUE, EAST INDIAN WALNUT</b>	Asia & Australia	Myricaceae
<i>Allamanda cathartica hendersoni</i>	<b>GOLDEN TRUMPET</b>	Brazil	Apocynaceae
<i>Allamanda cathartica williamsi</i>	<b>DOUBLE ALLAMANDA</b>	Brazil	Apocynaceae
<i>Allamanda neriiifolia</i>	<b>YELLOW BELL</b>	Brazil	Apocynaceae
<i>Alpinia nutans</i>	<b>SHELL GINGER, PEARL GINGER</b>	Trop. E. Asia	Zingiberaceae
<i>Ammomum cardamon</i>	<b>CARDAMON</b>	E. Indies	Zingiberaceae
<i>Annona montana</i>	<b>MOUNTAIN SOURSOP</b>	W. Indies	Annonaceae
<i>Annona squamosa</i>	<b>SUGAR-APPLE, SWEETSOP</b>	S. America	Annonaceae
<i>Araucaria cunninghami</i>	<b>MORETON BAY PINE, HOOP PINE</b>	Australia	Araucariaceae
<i>Araucaria bidwilli</i>	<b>MONKEY-PUZZLE TREE, BUNYA-BUNYA</b>	Australia	Araucariaceae
<i>Araucaria excelsa</i>	<b>NORFOLK ISLAND PINE</b>	Norfolk Island	Araucariaceae
<i>Arecastrum romanzoffianum</i>	<b>QUEEN PALM</b>	Argentina & Bolivia	Palmaceae
<i>Arenga saccharifera</i>	<b>SUGAR PALM</b>	Malaya	Palmaceae
<i>Asplenium nidus-avis</i>	<b>BIRD'S NEST FERN</b>	Polynesia	Polypodiaceae
<i>Aucuba japonica variegata</i>	<b>GOLD-DUST TREE, JAPANESE LAUREL</b>	Himalayas to Japan	Cornaceae
<i>Averrhoa carambola</i>	<b>CARAMBOLA or STAR FRUIT</b>	Malaya	Oxalidaceae
<i>Bambusa falcata nana</i>	<b>DWARF BAMBOO</b>	Japan	Gramineae
<i>Bambusa ventricosa</i>	<b>BUDDHA'S BELLY BAMBOO</b>	China	Gramineae
<i>Bambusa vulgaris</i>	<b>BAMBOO</b>	Java	Gramineae
<i>Bauhinia blakeana</i>	<b>HONG KONG ORCHID TREE</b>	China	Leguminosae
<i>Bauhinia galpini</i>	<b>RED BAUHINIA, PRIDE OF THE CAPE</b>	Africa	Leguminosae
<i>Beaumontia grandiflora</i>	<b>HERALD'S TRUMPET</b>	India	Apocynaceae
<i>Bombax malabaricum</i>	<b>RED SILK COTTON TREE</b>	India	Bombacaceae
<i>Bougainvillea sp.</i>	<b>BOUGAINVILLEA</b>	Brazil	Nyctagtiaceae
<i>Brachychiton acerifolium</i>	<b>FLAME BOTTLETREE</b>	Australia	Sterculiaceae
<i>Brachychiton populneum</i>	<b>KURRAJONG</b>	Australia	Sterculiaceae
<i>Brassaia actinophylla</i> ( <i>Schefflera actinophylla</i> )	<b>QUEENSLAND UMBRELLA OCTOPUS TREE</b>	Australia	Araliaceae
<i>Brunfelsia calycina</i>	<b>YESTERDAY-TODAY-and-TOMORROW</b>	Brazil	Solanaceae
<i>Bucida buceras</i>	<b>GEOOMETRY TREE, BLACK OLIVE</b>	Trop. America	Combretaceae
<i>Bursera simaruba</i>	<b>GUMBO LIMBO, NAKED INDIAN</b>	Trop. America	Burseraceae
<i>Butea monosperma (frondosa)</i>	<b>FLAME OF THE FOREST</b>	India to Burma	Leguminosae
<i>Calliandra emarginata</i>	<b>DWARF RED POWDER PUFF</b>	Mexico	Leguminosae
<i>Calliandra haemetocephala</i>	<b>REDHEAD POWDER PUFF</b>	S. America	Leguminosae
<i>Calliandra surinamensis</i>	<b>POWDER PUFF</b>	Guiana	Leguminosae
<i>Callistemon viminalis</i>	<b>BOTTLEBRUSH</b>	Australia	Myrtaceae

Botanical Name	Common Name	Origin	Family
<i>Cananga odorata</i>	PERFUME TREE, YLANG-YLANG	Philippines	Annonaceae
<i>Carissa grandiflora</i>	NATAL PLUM	S. Africa	Apocynaceae
<i>Caryota mitis</i>	FISHTAIL PALM	Malaya	Palmaceae
<i>Cassia alata</i>	CANDLEBUSH, ACAPULCO	Trop. America	Leguminosae
<i>Catha edulis</i>	KHAT, ARABIAN TEA	Abyssinia & S. Africa	Celastraceae
<i>Cecropia palmata</i>	SLOTH TREE, PUMPWOOD or SNAKEWOOD	S. America	Moraceae
<i>Cecropia peltata</i>	ANT FEEDER TREE, TRUMPET TREE	S. America	Moraceae
<i>Ceratonia siliqua</i>	CAROB or ST. JOHN'S BREAD	Mediterranean	Leguminosae
<i>Cestrum nocturnum</i>	NIGHT BLOOMING JASMINE	W. Indies	Solanaceae
<i>Chlorophytum elatum</i>	AIRPLANE PLANT	S. Africa	Liliaceae
<i>Chorisia insignis</i>	EASTER LILY TREE	Peru & Argentina	Bombacaceae
<i>Chrysalidocarpus, sp.</i>	CABADO PALM	Cuba	Palmaceae
<i>Chrysalidocarpus lutescens</i>	BAMBOO PALM, GOLDEN FEATHER PALM	Madagascar	Palmaceae
<i>Chrysobalanus icaco</i>	COCO-PLUM	S. Fla. to Brazil	Rosaceae
<i>Cinnamomum camphora</i>	CAMPHOR	China & Japan	Lauraceae
<i>Cinnamomum japonica</i>	CINNAMOMUM JAPONICA	Japan	Lauraceae
<i>Citrus aurantifolia</i>	PERSIAN LIME	Tahiti	Rutaceae
<i>Citrus aurantifolia, C. limetta</i>	MEXICAN LIME, KEY LIME	W. Indies	Rutaceae
<i>Citrus nobilis, deliciosa</i>	TANGERINE	Cochin China	Rutaceae
<i>Citrus limonia, C. hybrida</i>	PONDEROSA LEMON, AMERICAN WONDER-LEMON	Maryland	Rutaceae
<i>Citrus mitis</i>	DWARF CALAMONDIN ORANGE	Philippines	Rutaceae
<i>Citrus paradisi</i>	GRAPEFRUIT TREE	W. Indies	Rutaceae
<i>Clausena lansium</i>	WAMPI or WAMPEE	China	Rutaceae
<i>Clusia rosea</i>	MONKEY APPLE, AUTOGRAPH TREE	W. Indies	Guttiferae
<i>Coccoloba laurifolia</i>	PIGEON PLUM	S. Fla. & Bahamas	Polygonaceae
<i>Coccoloba uvifera</i>	SEA GRAPE	Trop. America	Polygonaceae
<i>Cocos nucifera</i>	GOLDEN COCONUT	Trop. Cosmopolitan	Palmaceae
<i>Coccothrinax dussiana</i>	SILVER PALM	Barbados	Palmaceae
<i>Cochlospermum vitifolium</i>	WILD COTTON, BUTTERCUP TREE	W. Indies	Cochlospermaceae
<i>Codiaeum variegatum</i>	CORKSCREW CROTON	S. India, Ceylon	Euphorbiaceae
<i>Codiaeum variegatum pictum</i>	CROTON	S. Sea Is.	Euphorbiaceae
<i>Coffea arabica</i>	COFFEE TREE	Africa & Asia	Rubiaceae
<i>Colocasia antiquorum</i>	ELEPHANT'S-EAR, TARO	Trop. Asia	Araceae
<i>Crescentia cujete</i>	CALABASH	Trop. America	Bignoniaceae
<i>Crinum angusta</i>	MILK AND WINE LILY	Asia	Amaryllidaceae
<i>Datura arborea</i>	ANGEL'S TRUMPET	Peru	Solanaceae
<i>Delonix regia</i>	ROYAL POINCIANA, FLAMBOYANT	Madagascar	Leguminosae
<i>Dictyosperma album</i>	HURRICANE PALM, WHITE PRINCESS PALM	Mascarene Is.	Palmaceae
<i>Dieffenbachia amoena</i>	DUMB-CANE	Trop. America	Araceae
<i>Dillenia indica</i>	HONDAPARA	India	Dilleniaceae
<i>Diospyros ebenaster</i>	INDIAN EBONY PERSIMMON CHOCOLATE PUDDING FRUIT	W. Indies & Mexico	Ebenaceae
<i>Dizygotheca elegantissima</i>	FALSE ARALIA	New Hebrides	Araliaceae
<i>Dombeya elegans</i>	DOMBEYA	Madagascar	Sterculiaceae
<i>Dombeya wallichii</i>	PINK SNOWBALL	Madagascar	Sterculiaceae
<i>Dovyalis hebecarpa</i>	CEYLON GOOSEBERRY	India & Ceylon	Flacourtiaceae
<i>Doxantha unguis-cati</i>	CAT'S CLAW, HUG ME TIGHT	Argentina	Bignoniaceae
<i>Dracaena marginata</i>	HALAPEPE	Madagascar	Liliaceae

Botanical Name	Common Name	Origin	Family
<i>Enellagma cucurbitina</i>	<b>BLACK CALABASH</b>	Trop. America	Bignoniaceae
<i>Enterolobium cyclocarpum</i>	<b>EAR POD TREE, ELEPHANT'S LEG</b>	Venezuela	Leguminosae
<i>Eriobotrya japonica</i>	<b>LOQUAT</b>	China	Rosaceae
<i>Erythrina caffra</i>	<b>CORAL TREE</b>	S. Africa	Leguminosae
<i>Eucalyptus cinerea</i>	<b>SILVER DOLLAR TREE</b>	Wales & Victoria	Myrtaceae
<i>Eucalyptus hemiphloia</i>	<b>BLUE GUM EUCALYPTUS</b>	Australia	Myrtaceae
<i>Eugenia dombeyi</i>	<b>GRUMICHAMA, BRAZILIAN CHERRY</b>	Brazil	Myrtaceae
<i>Eugenia jambolana</i>	<b>JAVA PLUM</b>	E. Indies	Myrtaceae
<i>Eugenia jambos</i>	<b>ROSE APPLE, JAMBU</b>	E. Indies	Myrtaceae
<i>Eugenia myrtifolia</i>	<b>AUSTRALIAN BRUSH CHERRY</b>	Australia	Myrtaceae
<i>Eugenia uniflora</i>	<b>SURINAM CHERRY, PITANGA</b>	Brazil	Myrtaceae
<i>Euphoria longan</i>	<b>LONGAN</b>	China	Sapindaceae
<i>Eupritchardia pacifica</i>	<b>FIJI ISLAND FAN PALM</b>	Fiji & Samoa	Palmaceae
<i>Fatsia japonica</i>	<b>ARALIA JAPONICA</b>	Japan	Araliaceae
<i>Feijoa sellowiana</i>	<b>PINEAPPLE GUAVA</b>	S. America	Myrtaceae
<i>Ficus altissima</i>	<b>LOFTY FIG</b>	India	Moraceae
<i>Ficus carica</i>	<b>COMMON FIG</b>	Mediterranean	Moraceae
<i>Ficus elastica</i>	<b>INDIA RUBBER PLANT</b>	India & Malaya	Moraceae
<i>Ficus lyrata, F. pandurata</i>	<b>FIDDLE LEAF FIG</b>	W. Africa	Moraceae
<i>Ficus nitida, F. retusa</i>	<b>CUBAN LAUREL, CHINESE BANYAN</b>	India & Malaya	Moraceae
<i>Ficus parcelli</i>	<b>VARIEGATED FIG, CLOWN FIG</b>	S. Pacific Is.	Moraceae
<i>Ficus pseudopalma</i>	<b>FALSE PALM</b>	Philippines	Moraceae
<i>Ficus religiosa</i>	<b>SACRED BO TREE</b>	India	Moraceae
<i>Ficus repens</i>	<b>CLIMBING FIG, CREEPING FIG</b>	China & Japan	Moraceae
<i>Flacourtia indica</i>	<b>GOVERNOR'S PLUM</b>	Madagascar & S. Asia	Flacourtiaceae
<i>Gardenia taitensis</i>	<b>GARDENIA</b>	Tahiti	Rubiaceae
<i>Grevillea banksi</i>	<b>RED SILK-OAK, KAHILI FLOWER</b>	India	Proteaceae
<i>Grevillea robusta</i>	<b>SILK OAK, SPIDER FLOWERS</b>	Australia	Proteaceae
<i>Harpephyllum caffrum</i>	<b>KAFIR PLUM</b>	S. Africa	Anacardiaceae
<i>Heliconia bourageana</i>	<b>HELICONIA</b>	S. America	Musaceae
<i>Hibiscus elatus</i>	<b>CUBAN BAST — TREE HIBISCUS</b>	W. Indies	Malvaceae
<i>Hibiscus matensis</i>	<b>SNOW QUEEN HIBISCUS</b>	E. Indies	Malvaceae
<i>Hibiscus rosa-sinensis</i>	<b>HIBISCUS, ROSE OF CHINA, SHOEBLACK PLANT</b>	S. China	Malvaceae
<i>Homalocladium platyclados</i>	<b>TAPEWORM PLANT, RIBBON BUSH</b>	Solomon Is.	Polygonaceae
<i>Howea forsteriana</i>	<b>KENTIA or FLAT PALM</b>	Lord Howe's Is.	Palmaceae
<i>Illicium anisatum</i>	<b>STAR ANISE</b>	Japan	Magnoliaceae
<i>Ipomoea horsfalliae</i>	<b>BRAZILIAN MORNING GLORY PRINCE'S VINE</b>	E. Indies	Convolvulaceae
<i>Ixora coccinea</i>	<b>FLAME OF THE WOODS JUNGLE GERANIUM</b>	E. Indies	Rubiaceae
<i>Jacaranda acutifolia</i>	<b>JACARANDA</b>	Brazil	Bignoniaceae
<i>Jasminum ilicifolium</i>	<b>STAR JASMINE</b>	W. Africa	Oleaceae
<i>Jatropha curcas</i>	<b>BARBADOS NUT</b>	Trop. America	Euphorbiaceae
<i>Jatropha hastata</i>	<b>PEREGRINA</b>	Cuba	Euphorbiaceae
<i>Khaya nyasica</i>	<b>AFRICAN MAHOGANY</b>	Africa	Meliaceae
<i>Kigelia pinnata</i>	<b>SAUSAGE TREE</b>	Africa	Bignoniaceae
<i>Koelreuteria formosana</i>	<b>GOLDENRAIN TREE</b>	Formosa	Sapindaceae

Botanical Name	Common Name	Origin	Family
<i>Litcli chinensis</i>	LYCHEE NUT	S. China	Sapindaceae
<i>Livistona australis</i>	AUSTRALIAN FAN PALM	Australia	Palmaceae
<i>Macadamia ternifolia</i>	MACADAMIA NUT	Australia	Proteaceae
<i>Malpighia glabra</i>	BARDADOS CHERRY	W. Indies	Malpighiaceae
<i>Mangifera indica</i>	MANGO	E. Indies	Anacardiaceae
<i>Melaleuca leucadendron</i>	PUNK TREE, CAJEPUT	Australia	Myrtaceae
<i>Melicocca bijuga</i>	SPANISH-LIME	Trop. America	Sapindaceae
<i>Monstera deliciosa</i>	CERIMAN, MEXICAN BREADFRUIT	Trop. America	Araceae
<i>Muntingia calabura</i>	STRAWBERRY TREE, JAM-FRUIT	Trop. America & W. Indies	Elaeocarpaceae
<i>Murraya exotica</i>	ORANGE JESSAMINE	India	Rutaceae
<i>Musa cavendishi</i>	DWARF BANANA	S. China	Musaceae
<i>Musa ensete, ventricosum</i>	ABYSSINIAN BANANA	Abyssinia	Musaceae
<i>Musa rosaceae</i>	PINK BANANA, FLOWERING BANANA	India	Musaceae
<i>Musa sapientum</i>	BANANA	India	Musaceae
<i>Musa zebrina</i>	BLOOD BANANA	Java	Musaceae
<i>Myrica cerifera</i>	WAX MYRTLE, BAY TREE	Florida	Myricaceae
<i>Myrciaria cauliflora</i>	JABOTICABA, BRAZILIAN GRAPE TREE	Brazil	Myrtaceae
<i>Myrtus communis</i>	MYRTLE	Mediterranean	Myrtaceae
<i>Nandina domestica</i>	HEAVENLY BAMBOO	China & Japan	Berberidaceae
<i>Nerium oleander</i>	OLEANDER	Mediterranean	Apocynaceae
<i>Noronhia emarginata</i>	MADAGASCAR OLIVE	Madagascar	Oleaceae
<i>Ochrosia elliptica</i>	DEADLY OCHROSIA	S. Pacific	Apocynaceae
<i>Olea europaea</i>	OLIVE	Mediterranean	Oleaceae
<i>Pandanus utilis</i>	SCREW PINE, TOURISTS' PINEAPPLE	Madagascar	Pandanaceae
<i>Pandanus veitchi</i>	RIBBON GRASS	Polynesia	Pandanaceae
<i>Parkinsonia aculeata</i>	JERUSALEM THORN	Trop. America	Leguminosae
<i>Passiflora vitifolia</i>	RED PASSION FLOWER, TACSONIA	New Spain	Passifloraceae
<i>Paurotis wrighti</i>	SAW CABBAGE PALM	S. Fla. & Bahamas	Palmaceae
<i>Peltophorum inerme</i>	YELLOW POINCIANA	Indo-Malaya	Leguminosae
<i>Persea americana</i>	AVOCADO	Trop. America	Lauraceae
<i>Phoenix canariensis</i>	CANARY ISLAND DATE PALM	Canary Is.	Palmaceae
<i>Phoenix dactylifera</i>	DATE PALM	W. Asia-N. Africa	Palmaceae
<i>Phoenix roebelinii</i>	PIGMY DATE PALM	Siam	Palmaceae
<i>Pimenta officinalis</i>	ALLSPICE TREE	W. Indies & C. America	Myrtaceae
<i>Piper unguiculatum</i>	PEPPER	E. Indies	Piperaceae
<i>Pistacia integerina</i>	PISTACIA	Med. to Asia	Anacardiaceae
<i>Pittosporum tobira</i>	TOBIRA, JAPANESE PITTOSPORUM	China & Japan	Pittosporaceae
<i>Plumeria acutifolia</i>	FRANGIPANI, TEMPLE TREE	Trop. America	Apocynaceae
<i>Podocarpus macrophylla maki</i>	PODOCARPUS	Japan	Podocarpaceae
<i>Poinciana gilliesii</i>	DWARF POINCIANA	Trop. Cosmop.	Leguminosae
<i>Polyscias balfouriana</i>	VARIEGATED ARALIA	New Caledonia	Araliaceae
<i>Poncirus trifoliata</i>	TRIFOLIATA ORANGE	China	Rutaceae
<i>Psidium sp.</i>	POST JELLY GUAVA (Hybrid var.)	Trop. America	Myrtaceae
<i>Pritchardia pacifica</i>	FIJI ISLAND FAN PALM	Fiji & Samoa	Palmaceae
<i>Prunus caroliniana</i>	LAUREL CHERRY, EVERGREEN CHERRY	N. Car. to Texas	Rosaceae
<i>Psidium cattleianum</i>	STRAWBERRY GUAVA	Brazil	Myrtaceae
<i>Psidium guajava</i>	COMMON OR LEMON GUAVA	Trop. America	Myrtaceae

Botanical Name	Common Name	Origin	Family
<i>Ptychosperma elegans</i>	<b>SOLITAIRE PALM</b>	Australia	Palmaceae
<i>Punica granatum</i>	<b>POMEGRANATE</b>	S. Asia	Punicaceae
<i>Pyracantha graberi</i>	<b>FIRETHORN</b>	China	Rosaceae
<i>Quisqualis indica</i>	<b>RANGOON CREEPER</b>	Indo-Malaya	Combretaceae
<i>Ravenala madagascariensis</i>	<b>TRAVELER'S TREE</b>	Madagascar	Musaceae
<i>Roystonea regia</i>	<b>ROYAL PALM</b>	Cuba	Palmaceae
<i>Salvia rutilans</i>	<b>PINEAPPLE MINT</b>	Europe	Labiatae
<i>Sapium sebiferum</i>	<b>CHINESE TALLOW TREE</b>	S. China & Japan	Euphorbiaceae
<i>Schinus terebinthifolius</i>	<b>BRAZILIAN PEPPER, CHRISTMAS BERRY</b>	Brazil	Anacardiaceae
<i>Severinia buxifolia</i>	<b>CHINESE BOX-ORANGE</b>	China	Rutaceae
<i>Solanum abutiloides</i>	<b>DOG-PATCH PERFUME</b>	Trop. America	Solanaceae
<i>Solanum pseudo-capsicum</i>	<b>JERUSALEM CHERRY</b>	Madeira	Solanaceae
<i>Solanum rantonetti</i>	<b>BLUE POTATO BUSH</b>	S. America	Solanaceae
<i>Solanum seaforthianum</i>	<b>BRAZILIAN NIGHTSHADE TOMATILLO</b>	Trop. America	Solanaceae
<i>Spathiphyllum kochi</i>	<b>SPATHIPHYLLUM</b>	Trop. America	Araceae
<i>Spathodea campanulata</i>	<b>AFRICAN TULIP TREE-FLAME OF THE FOREST</b>	Trop. Africa	Bignoniaceae
<i>Spondias cytherea</i>	<b>HOG PLUM AMBARELLA</b>	Gen. America	Anacardiaceae
<i>Stenocarpus sinuatus</i>	<b>FIREWHEEL TREE</b>	Australia	Proteaceae
<i>Strelitzia nicolai</i>	<b>GIANT BIRD-OF-PARADISE</b>	S. Africa	Musaceae
<i>Strelitzia reginae</i>	<b>BIRD-OF-PARADISE</b>	S. Africa	Musaceae
<i>Swietenia mahogani</i>	<b>MAHOGANY</b>	W. Indies & Florida	Meliaceae
<i>Tabebuia argentea</i>	<b>GOLD TREE</b>	Paraguay	Bignoniaceae
<i>Taraktogenus kurzi</i>	<b>CHAULMOOGRA, OIL TREE</b>	N. Burma	Flacourticeae
<i>Terminalia catappa</i>	<b>TROPICAL ALMOND, INDIAN ALMOND</b>	Malaya	Combretaceae
<i>Tetrapanax papyriferus</i>	<b>RICE PAPER TREE</b>	Formosa	Araliaceae
<i>Tibouchina semidecandra</i>	<b>GLORY-BUSH, PRINCESS FLOWER</b>	Brazil	Melastomaceae
<i>Trachelospermum grandiflorum</i>	<b>CONFEDERATE JASMINE</b>	S. China	Apocynaceae
<i>Trevesia micholitzii</i>	<b>SNOWFLAKE</b>	China	Araliaceae
<i>Veitchia merrilli</i> formerly <i>Adonidia</i>	<b>CHRISTMAS PALM, MANILA PALM</b>	Philippine Is.	Palmaceae
<i>Viburnum odoratissimum</i>	<b>EVERGREEN SNOWBALL</b>	India to Japan	Caprifoliaceae
<i>Washingtonia robusta</i>	<b>THREAD PALM</b>	Lower Calif. & Mexico	Palmaceae
<i>Yucca elephantipes</i>	<b>SPINELESS YUCCA</b>	Mexico	Liliaceae

Reservations for guided tours of the Conservatory at Denver Botanic Gardens may be made by calling the Conservatory number, 297-2348, between 9:00 a.m. and 4:00 p.m. daily.

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A botanic garden is a collection of growing plants, the primary purpose of which is the advancement and diffusion of botanical knowledge. This purpose may be accomplished in a number of different ways with the particular placing of emphasis on different departments of biological science.

The scientific and educational work of a botanical garden center around the one important and essential problem of maintaining a collection of living plants, both native and exotic, with the end purpose of acquisition and dissemination of botanical knowledge.







